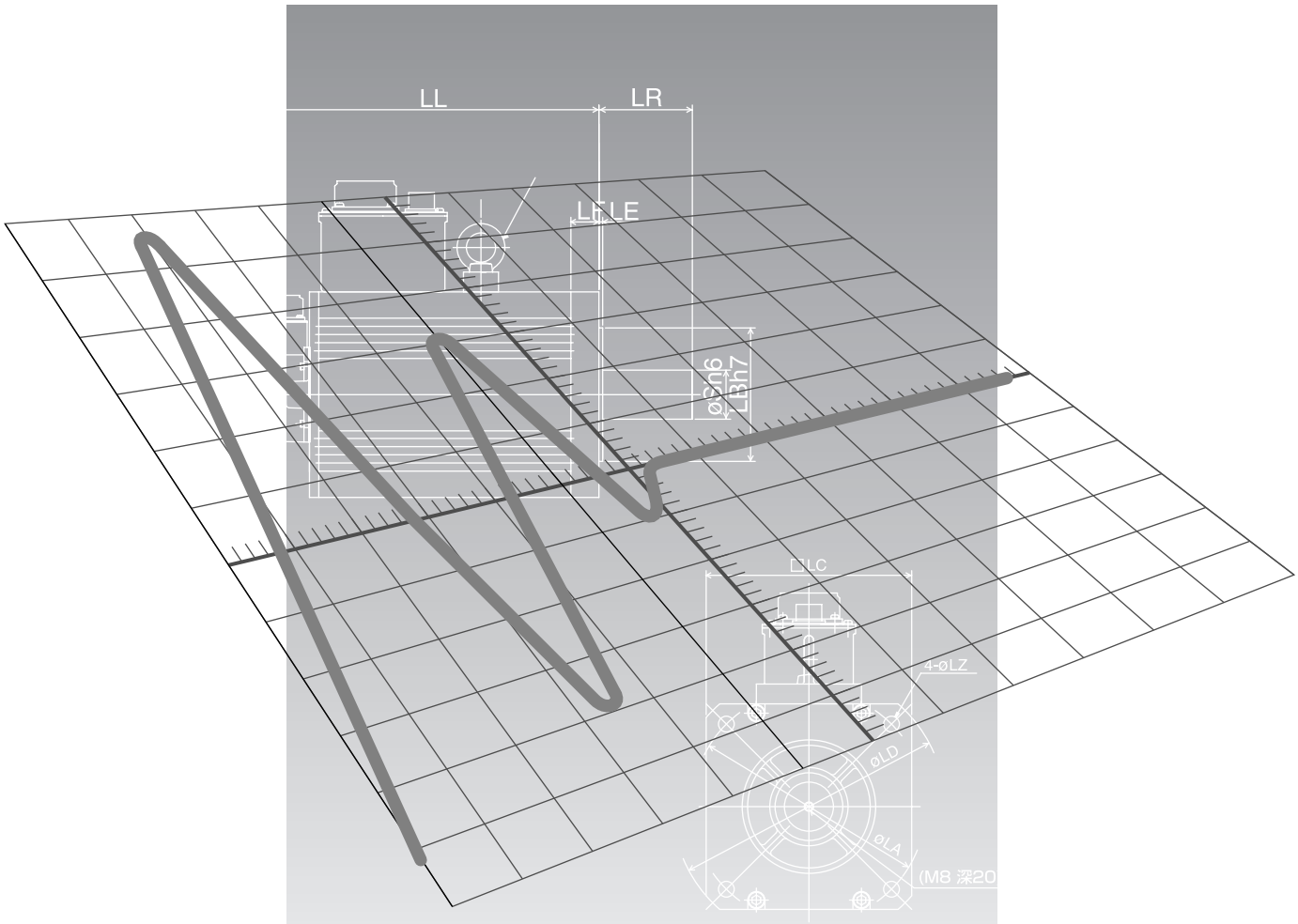

[Supplement]

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Conformity to EC Directives and UL Standards

EC Directives

The EC Directives apply to all such electronic products as those having specific functions and have been exported to EU and directly sold to general consumers. Those products are required to conform to the EU unified standards and to furnish the CE marking on the products.
However, our AC servos meet the relevant EC Directives for Low Voltage Equipment so that the machine or equipment comprising our AC servos can meet EC Directives.

EMC Directives

MINAS Servo System conforms to relevant standard under EMC Directives setting up certain model (condition) with certain locating distance and wiring of the servo motor and the driver. And actual working condition often differs from this model condition especially in wiring and grounding. Therefore, in order for the machine to conform to the EMC Directives, especially for noise emission and noise terminal voltage, it is necessary to examine the machine incorporating our servos.

Conformed Standards

Subject	Conformed Standard		
Motor	IEC60034-1 IEC60034-5 UL1004 CSA22.2 No.100		Conforms to Low-Voltage Directives
Motor/ Motor and driver	EN50178 UL508C		
	EN55011	Radio Disturbance Characteristics of Industrial, Scientific and Medical (ISM) Radio-Frequency Equipment	Standards referenced by EMC Directives
	EN61000-6-2	Immunity for Industrial Environments	
	IEC61000-4-2	Electrostatic Discharge Immunity Test	
	IEC61000-4-3	Radio Frequency Electromagnetic Field Immunity Test	
	IEC61000-4-4	Electric High-Speed Transition Phenomenon/Burst Immunity Test	
	IEC61000-4-5	Lightening Surge Immunity Test	
	IEC61000-4-6	High Frequency Conduction Immunity Test	
	IEC61000-4-11	Instantaneous Outage Immunity Test	

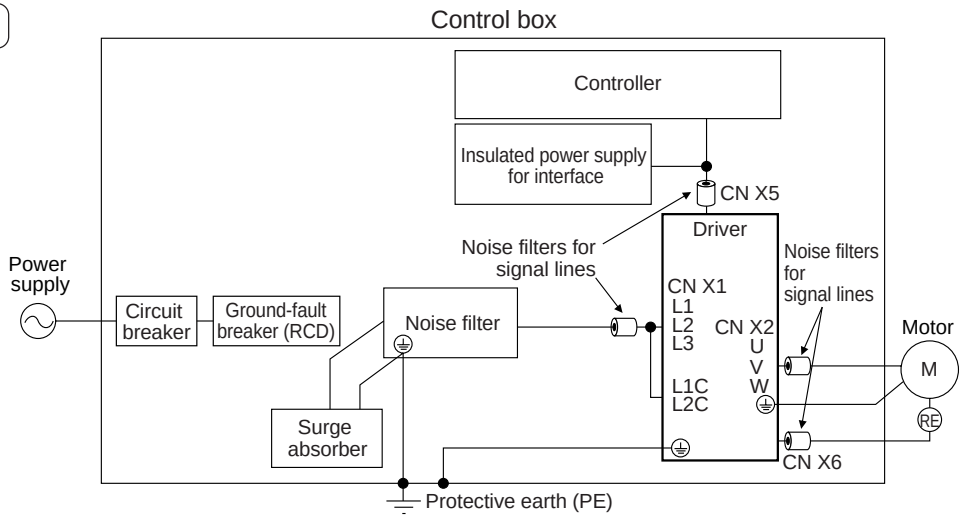
IEC : International Electrotechnical Commission
EN : Europaischen Normen
EMC : Electromagnetic Compatibility
UL : Underwriters Laboratories
CSA : Canadian Standards Association

<Precautions in using options>
Use options correctly after reading operation manuals of the options to better understand the precautions. Take care not to apply excessive stress to each optional part.

Composition of Peripheral Equipments

Installation Environment

Use the servo driver in the environment of Pollution Degree 1 or 2 prescribed in IEC-60664-1 (e.g. Install the driver in control panel with IP54 protection structure.)



Power Supply

100V type : Single phase, (A, B and C-frame)	100V	+10% –15%	to	115V	+10% –15%	50/60Hz
200V type : Single phase, (B, C-frame)	200V	+10% –15%	to	240V	+10% –15%	50/60Hz
200V type : Single/3-phase, (C, D-frame)	200V	+10% –15%	to	240V	+10% –15%	50/60Hz
200V type : 3-phase, (E, F-frame)	200V	+10% –15%	to	230V	+10% –15%	50/60Hz

(1) This product is designed to be used at over-voltage category (Installation category) II of EN 50178:1997. If you want to use this product un over-voltage category (Installation category) III, install a surge absorber which complies with EN61634-11:2002 or other relevant standards at the power input portion.
(2) Use an insulated power supply of DC12 to 24V which has CE marking or complies with EN60950

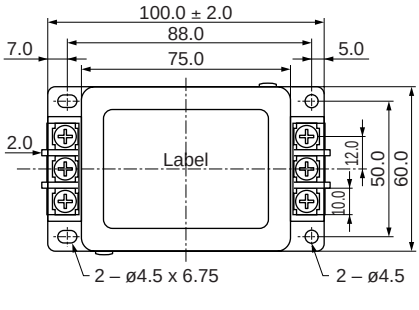
Circuit Breaker

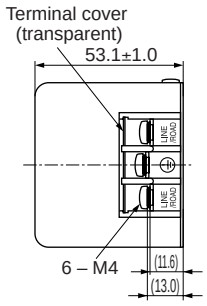
Install a circuit breaker which complies with IEC Standards and UL recognizes (Listed and Ⓤ marked) between power supply and noise filter.

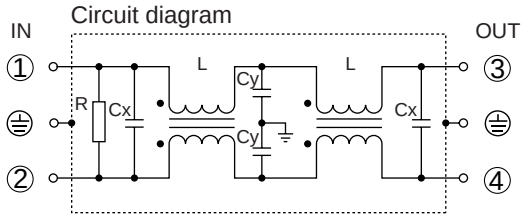
Noise Filter

When you install one noise filter at the power supply for multi-axes application, contact to a manufacture of the noise filter.

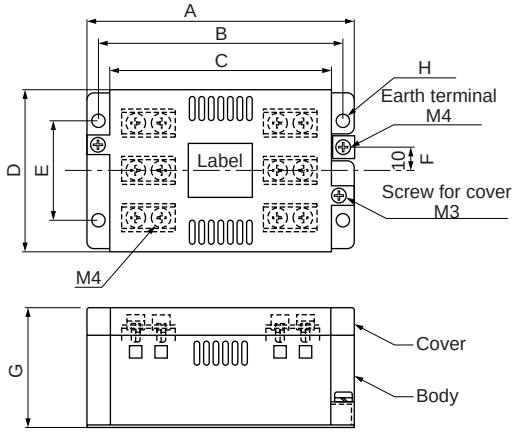
Option part No.	Voltage specifications for driver	Manufacturer' s part No.	Applicable driver (frame)	Manufacturer
DV0P4170	Single phase 100V/200V	SUP-EK5-ER-6	A and B-frame	Okaya Electric Ind.

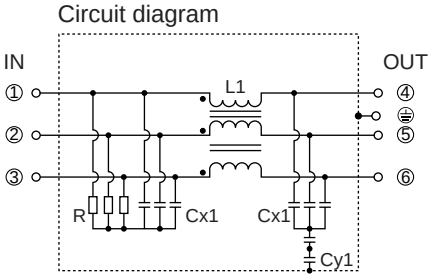






Option part No.	Voltage specifications for driver	Manufacturer' s part No.	Applicable driver (frame)	Manufacturer
DV0P4180	3-phase 200V	3SUP-HQ10-ER-6	C-frame	Okaya Electric Ind.
DV0P4220		3SUP-HU30-ER-6	D and E-frame	

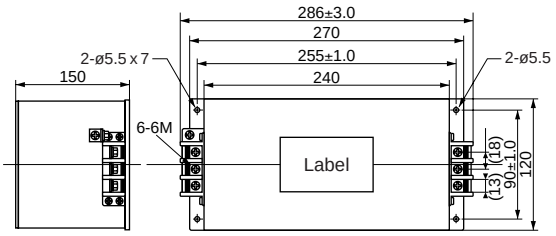




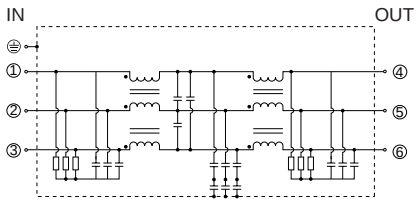
	A	B	C	D	E	F	G	H	K	L
DV0P4180	115	105	95	70	43	10	52	5.5	M4	M4
DV0P4220	145	135	125	70	50	10	52	5.5	M4	M4

Conformity to EC Directives and UL Standards

Option part No.	Voltage specifications for driver	Manufacturer' s part No.	Applicable driver (frame)	Manufacturer
DV0P3410	3-phase 200V	3SUP-HL50-ER-6B	F-frame	Okaya Electric Ind.



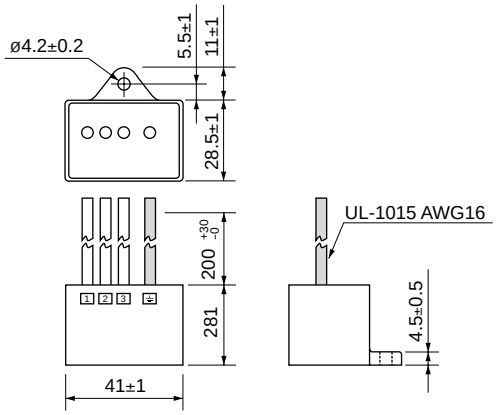
Circuit diagram



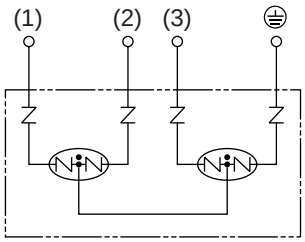
Surge Absorber

Provide a surge absorber for the primary side of noise filter.

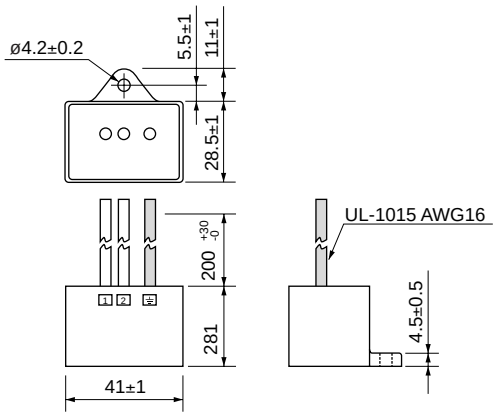
Option part No.	Voltage specifications for driver	Manufacturer' s part No.	Manufacturer
DV0P1450	3-phase 200V	R . A .V-781BXZ-4	Okaya Electric Ind.



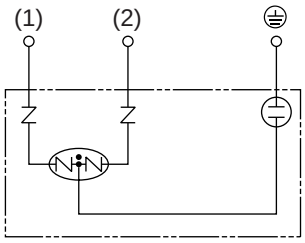
Circuit diagram



Option part No.	Voltage specifications for driver	Manufacturer' s part No.	Manufacturer
DV0P4190	Single phase 100/200V	R . A .V-781BWZ-4	Okaya Electric Ind.



Circuit diagram



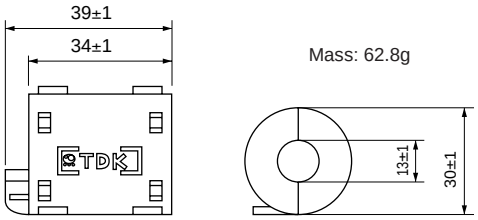
<Remarks>

Take off the surge absorber when you execute a dielectric test to the machine or equipment, or it may damage the surge absorber.

Noise Filter for Signal Lines *

Install noise filters for signal lines to all cables (power cable, motor cable, encoder cable and interface cable)
* In case of D-frame, install 3 noise filters at power line.

Option part No.	Manufacturer' s part No.	Manufacturer
DV0P1460	ZCAT3035-1330	TDK Corp.



<Caution>
Fix the signal line noise filter in place to eliminate excessive stress to the cables.

Grounding

(1) Connect the protective earth terminal (⏚) of the driver and the protective earth terminal (PE) of the control box without fail to prevent electrical shocks.
(2) Do not make a joint connection to the protective earth terminals (⏚). 2 terminals are provided for protective earth.

Ground-Fault Breaker

Install a type B ground fault breaker (RCD) at primary side of the power supply.

<Note>
For driver and applicable peripheral equipments, refer to P.32 "Driver and List of Applicable Peripheral Equipments" of Preparation.

Driver and List of Applicable Peripheral Equipments (EC Directives)

Refer to P.32 "Driver and List of Applicable Peripheral Equipments" of Preparation.

Conformity to UL Standards

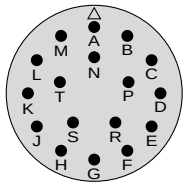
Observe the following conditions of (1) and (2) to make the system conform to UL508C (File No. E164620).
(1) Use the driver in an environment of Pollution Degree 2 or 1 prescribed in IEC60664-1. (e.g. Install in the control box with IP54 enclosure.)
(2) Install a circuit breaker or fuse which are UL recognized (LISTED Ⓤ marked) between the power supply and the noise filter without fail.
For the rated current of the circuit breaker or fuse, refer to P.32, "Driver and List of Applicable Peripheral Equipments" of Preparation.
Use a copper cable with temperature rating of 60˚C or higher.
Tightening torque of more than the max. values (M4:1.2N·m, M5: 2.0N·m) may break the terminal block.
(3) Over-load protection level
Over-load protective function will be activated when the effective current exceeds 115% or more than the rated current based on the time characteristics. Confirm that the effective current of the driver does not exceed the rated current. Set up the peak permissible current with SV.Pr5E (1st torque limit) and SV.Pr5F (2nd torque limit).

Options

Specifications of for Motor Connector

• Pin disposition for encoder connector

MSMA
MDMA
MFMA
MHMA
MGMA

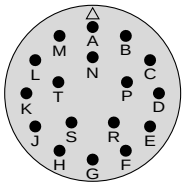


N/MS3102A20-29P

• Specifications of 2500P/r incremental encoder

Pin No.	Content	Pin No.	Content
A	NC	K	PS
B	NC	L	$\overline{PS}$
C	NC	M	NC
D	NC	N	NC
E	NC	P	NC
F	NC	R	NC
G	EOV	S	NC
H	E5V	T	NC
J	Frame GND		

MSMA
MDMA
MFMA
MHMA
MGMA



N/MS3102A20-29P

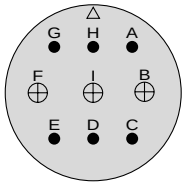
• Specifications of 17bit absolute/incremental encoder

Pin No.	Content	Pin No.	Content
A	NC	K	PS
B	NC	L	$\overline{PS}$
C	NC	M	NC
D	NC	N	NC
E	NC	P	NC
F	NC	R	NC
G	EOV	S	BAT–*
H	E5V	T	BAT+*
J	Frame GND		

*Connection to Pin-S and T are not required when used in incremental.

• Pin disposition for motor/brake connector (with brake)

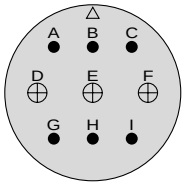
MSMA 1kW, 1.5kW, 2kW
MDMA 1kW, 1.5kW, 2kW
MFMA 400W, 1.5kW
MHMA 500W, 1kW, 1.5kW
MGMA 900W



JL04V-2E20-18PE-B-R
(by Japan Aviation Electronics or equivalent)

Pin No.	Content
G	Brake
H	Brake
A	NC
F	U-phase
I	V-phase
B	W-phase
E	Earth
D	Earth
C	NC

MSMA 3kW, 4kW, 5kW
MDMA 3kW, 4kW, 5kW
MFMA 2.5kW, 4.5kW
MHMA 2kW,3kW,4kW,5kW
MGMA 2kW, 3kW, 4.5kW

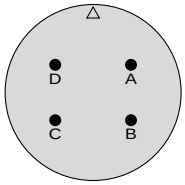


JL04V-2E24-11PE-B-R
(by Japan Aviation Electronics or equivalent)

Pin No.	Content
A	Brake
B	Brake
C	NC
D	U-phase
E	V-phase
F	W-phase
G	Earth
H	Earth
I	NC

• Pin disposition for motor/brake connector (without brake)

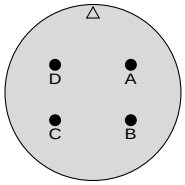
MSMA 1kW, 1.5kW, 2kW
MDMA 1kW, 1.5kW, 2kW
MHMA 500W, 1kW, 1.5kW
MGMA 900W



JL04V-2E20-4PE-B-R
(by Japan Aviation Electronics or equivalent)

PIN No.	Content
A	U-phase
B	V-phase
C	W-phase
D	Earth

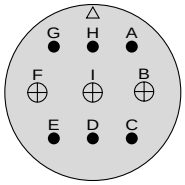
MSMA 3kW, 4kW, 5kW
MDMA 3kW, 4kW, 5kW
MHMA 2kW,3kW,4kW,5kW
MGMA 2kW, 3kW, 4.5kW



JL04V-2E22-22PE-B-R
(by Japan Aviation Electronics or equivalent)

PIN No.	Content
A	U-phase
B	V-phase
C	W-phase
D	Earth

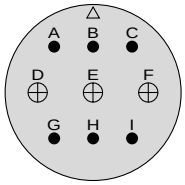
MFMA 400W, 1.5kW



JL04V-2E20-18PE-B-R
(by Japan Aviation Electronics or equivalent)

PIN No.	Content
G	NC
H	NC
A	NC
F	U-phase
I	V-phase
B	W-phase
E	Earth
D	Earth
C	NC

MFMA 2.5kW, 4.5kW



JL04V-2E24-11PE-B-R
(by Japan Aviation Electronics or equivalent)

PIN No.	Content
A	NC
B	NC
C	NC
D	U-phase
E	V-phase
F	W-phase
G	Earth
H	Earth
I	NC

Do not connect anything to NC pins.

Table for junction cable by model of MINAS A4P series

Motor type	Type of junction cable			Part No of junction cable	Fig.No.
MAMA 100W to 750W MSMD 50W to 750W MQMA 100W to 400W	Encoder	17bit, 7-wire	With battery holder for absolute encoder	MFECA0**0EAE	Fig.2-1
			Without battery holder for absolute encoder	MFECA0**0EAD	Fig.2-2
		2500P/r, 5-wire		MFECA0**0EAM	Fig.2-3
	Motor			MFMCA0**0EED	Fig.3-1
	Brake			MFMCB0**0GET	Fig.5-1
MSMA 1.0kW, 1.5kW MDMA 1.0kW, 1.5kW MHMA 0.5kW to 1.5kW MGMA 900W	Encoder	17bit, 7-wire	With battery holder for absolute encoder	MFECA0**0ESE	Fig.2-4
			Without battery holder for absolute encoder	MFECA0**0ESD	Fig.2-5
		2500P/r, 5-wire		MFECA0**0ESD	Fig.2-5
	Motor	without Brake		MFMCD0**2ECD	Fig.3-2
		Brake		MFMCA0**2FCD	Fig.4-1
MSMA 2.0kW MDMA 2.0kW	Encoder	17bit, 7-wire	With battery holder for absolute encoder	MFECA0**0ESE	Fig.2-4
			Without battery holder for absolute encoder	MFECA0**0ESD	Fig.2-5
		2500P/r, 5-wire		MFECA0**0ESD	Fig.2-5
	Motor	without Brake		MFMCD0**2ECT	Fig.3-3
		Brake		MFMCA0**2FCT	Fig.4-2
MSMA 3.0kW to 5.0kW MDMA 3.0kW to 5.0kW MHMA 2.0kW to 5.0kW MGMA 2.0kW to 4.5kW	Encoder	17bit, 7-wire	With battery holder for absolute encoder	MFECA0**0ESE	Fig.2-4
			Without battery holder for absolute encoder	MFECA0**0ESD	Fig.2-5
		2500P/r, 5-wire		MFECA0**0ESD	Fig.2-5
	Motor	without Brake		MFMCA0**3ECT	Fig.3-4
		Brake		MFMCA0**3FCT	Fig.4-3
MFMA 0.4kW, 1.5kW	Encoder	17bit, 7-wire	With battery holder for absolute encoder	MFECA0**0ESE	Fig.2-4
			Without battery holder for absolute encoder	MFECA0**0ESD	Fig.2-5
		2500P/r, 5-wire		MFECA0**0ESD	Fig.2-5
	Motor	without Brake		MFMCA0**2ECD	Fig.3-5
		Brake		MFMCA0**2FCD	Fig.4-1
MFMA 2.5kW, 4.5kW	Encoder	17bit, 7-wire	With battery holder for absolute encoder	MFECA0**0ESE	Fig.2-4
			Without battery holder for absolute encoder	MFECA0**0ESD	Fig.2-5
		2500P/r, 5-wire		MFECA0**0ESD	Fig.2-5
	Motor	without Brake		MFMCD0**3ECT	Fig.3-6
		Brake		MFMCA0**3FCT	Fig.4-3

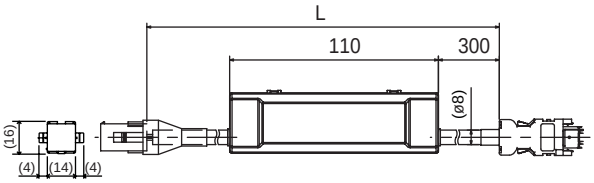
Options

Junction Cable for Encoder

MFECA00EAE**

MSMD 50W to 750W, MQMA 100W to 400W, MAMA 100W to 750W
17-bit absolute encoder with battery holder

Fig. 2-1



Title	Part No.	Manufacturer
Connector	551055100-0600 or 55100-0670 (lead-free)	Molex Inc.
Connector	172161-1	Tyco Electronics AMP
Connector pin	170365-1	
Cable	0.20mm^2 x 4P	Oki Electric Cable Co.

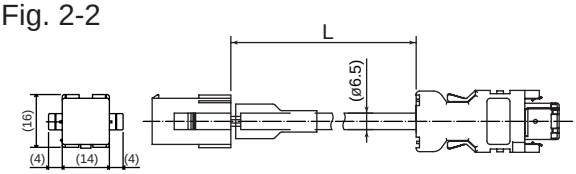
L(m)	Part No.
3	MFECA0030EAE
5	MFECA0050EAE
10	MFECA0100EAE
20	MFECA0200EAE

Note) Battery for absolute encoder is an option.

MFECA00EAD**

MSMD 50W to 750W, MQMA100W to 400W, MAMA 100W to 750W
17-bit incremental encoder without battery holder

Fig. 2-2



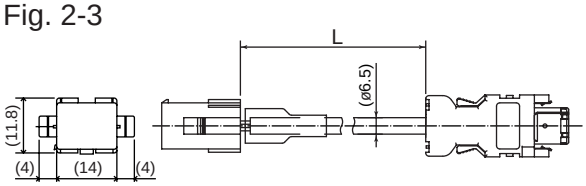
Title	Part No.	Manufacturer
Connector	55100-0600 or 55100-0670 (lead-free)	Molex Inc.
Connector	172161-1	Tyco Electronics AMP
Connector pin	170365-1	
Cable	0.20mm^2 x 3P	Oki Electric Cable Co.

L(m)	Part No.
3	MFECA0030EAD
5	MFECA0050EAD
10	MFECA0100EAD
20	MFECA0200EAD

MFECA00EAM**

MSMD 50W to 750W, MQMA 100W to 400W, MAMA 100W to 750W
2500P/r encoder

Fig. 2-3



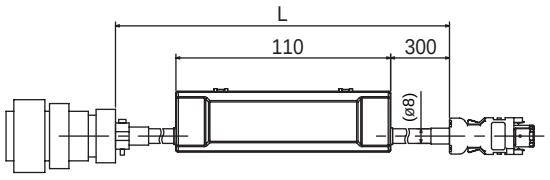
Title	Part No.	Manufacturer
Connector	55100-0600 or 55100-0670 (lead-free)	Molex Inc.
Connector	172160-1	Tyco Electronics AMP
Connector pin	170365-1	
Cable	0.20mm^2 x 3P	Oki Electric Cable Co.

L(m)	Part No.
3	MFECA0030EAM
5	MFECA0050EAM
10	MFECA0100EAM
20	MFECA0200EAM

MFECA00ESE**

MSMA, MDMA, MHMA, MGMA, MFMA
17-bit absolute encoder with battery holder

Fig. 2-4



Title	Part No.	Manufacturer
Connector	55100-0600 or 55100-0670 (lead-free)	Molex Inc.
Straight plug	N/MS3106B20-29S	Japan Aviation Electronics Ind.
Cable clamp	N/MS3057-12A	
Cable	0.20mm^2 x 4P	Oki Electric Cable Co.

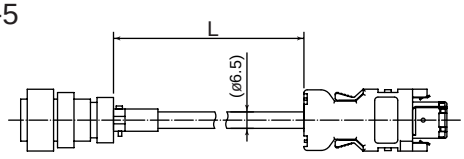
L(m)	Part No.
3	MFECA0030ESE
5	MFECA0050ESE
10	MFECA0100ESE
20	MFECA0200ESE

Note) Battery for absolute encoder is an option.

MFECA00ESD**

MSMA, MDMA, MHMA, MGMA, MFMA
17-bit incremental encoder without battery holder, 2500P/r encoder

Fig. 2-5



Title	Part No.	Manufacturer
Connector	55100-0600 or 55100-0670 (lead-free)	Molex Inc.
Straight plug	N/MS3106B20-29S	Japan Aviation Electronics Ind.
Cable clamp	N/MS3057-12A	
Cable	0.20mm^2 x 3P	Oki Electric Cable Co.

L(m)	Part No.
3	MFECA0030ESD
5	MFECA0050ESD
10	MFECA0100ESD
20	MFECA0200ESD

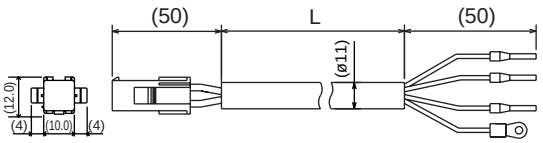
Junction Cable for Motor (ROBO-TOP® 105˚C 600V·DP)

ROBO-TOP® is a trade mark of Daiden Co.,Ltd.

MFMCA0**0EED

MSMD 50W to 750W, MQMA 100W to 400W, MAMA 100W to 750W

Fig. 3-1



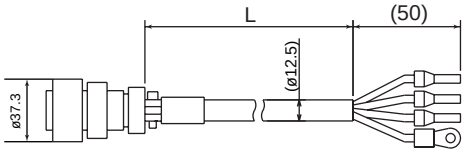
Title	Part No.	Manufacturer
Connector	172159-1	Tyco Electronics AMP
Connector pin	170366-1	
Rod terminal	AI0.75-8GY	Phoenix
Nylon insulated round terminal	N1.25-M4	J.S.T Mfg. Co., Ltd.
Cable	ROBO-TOP 600V 0.75mm²	Daiden Co.,Ltd.

L(m)	Part No.
3	MFMCA0030EED
5	MFMCA0050EED
10	MFMCA0100EED
20	MFMCA0200EED

MFMCD0**2ECD

MSMA 1.0kW to 1.5kW, MDMA 1.0kW to 1.5kW
MHMA 500W to 1.5kW, MGMA 900W

Fig. 3-2



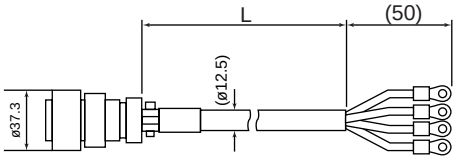
Title	Part No.	Manufacturer
Straight plug	JL04V-6A20-4SE-EB-R	Japan Aviation Electronics Ind.
Cable clamp	JL04-2022CK(14)-R	
Rod terminal	AI2.5-8BU	Phoenix
Nylon insulated round terminal	N2-M4	J.S.T Mfg. Co., Ltd.
Cable	ROBO-TOP 600V 2.0mm²	Daiden Co.,Ltd.

L(m)	Part No.
3	MFMCD0032ECD
5	MFMCD0052ECD
10	MFMCD0102ECD
20	MFMCD0202ECD

MFMCD0**2ECT

MSMA 2.0kW, MDMA 2.0kW

Fig. 3-3



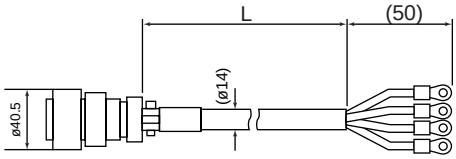
Title	Part No.	Manufacturer
Straight plug	JL04V-6A20-4SE-EB-R	Japan Aviation Electronics Ind.
Cable clamp	JL04-2022CK(14)-R	
Nylon insulated round terminal	N2-5	J.S.T Mfg. Co., Ltd.
Cable	ROBO-TOP 600V 2.0mm²	Daiden Co.,Ltd.

L(m)	Part No.
3	MFMCD0032ECT
5	MFMCD0052ECT
10	MFMCD0102ECT
20	MFMCD0202ECT

MFECA0**3ECT

MSMA 3.0kW to 5.0kW, MDMA 3.0kW to 5.0kW
MHMA 2.0kW to 5.0kW, MGMA 2.0kW to 4.5kW

Fig. 3-4



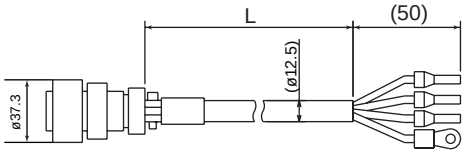
Title	Part No.	Manufacturer
Straight plug	JL04V-6A22-22SE-EB-R	Japan Aviation Electronics Ind.
Cable clamp	JL04-2022CK(14)-R	
Nylon insulated round terminal	N5.5-5	J.S.T Mfg. Co., Ltd.
Cable	ROBO-TOP 600V 3.5mm²	Daiden Co.,Ltd.

L(m)	Part No.
3	MFMCA0033ECT
5	MFMCA0053ECT
10	MFMCA0103ECT
20	MFMCA0203ECT

MFMCA0**2ECD

MFMA 400W to 1.5kW

Fig. 3-5



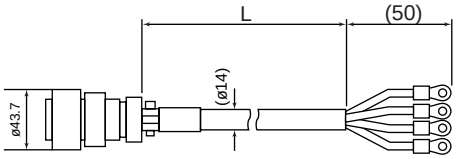
Title	Part No.	Manufacturer
Straight plug	JL04V-6A20-18SE-EB-R	Japan Aviation Electronics Ind.
Cable clamp	JL04-2022CK(14)-R	
Rod terminal	AI2.5-8BU	Phoenix
Nylon insulated round terminal	N2-M4	J.S.T Mfg. Co., Ltd.
Cable	ROBO-TOP 600V 2.0mm²	Daiden Co.,Ltd.

L(m)	Part No.
3	MFMCA0032ECD
5	MFMCA0052ECD
10	MFMCA0102ECD
20	MFMCA0202ECD

MFMCD0**3ECT

MFMA 2.5kW to 4.5kW

Fig. 3-6



Title	Part No.	Manufacturer
Straight plug	JL04V-6A24-11SE-EB-R	Japan Aviation Electronics Ind.
Cable clamp	JL04-2428CK(17)-R	
Nylon insulated round terminal	N5.5-5	J.S.T Mfg. Co., Ltd.
Cable	ROBO-TOP 600V 3.5mm²	Daiden Co.,Ltd.

L(m)	Part No.
3	MFMCD0033ECT
5	MFMCD0053ECT
10	MFMCD0103ECT
20	MFMCD0203ECT

Options

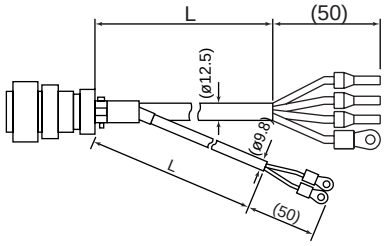
Junction Cable for Motor with Brake (ROBO-TOP® 105˚C 600V·DP)

ROBO-TOP® is a trade mark of Daiden Co.,Ltd.

MFMCA02FCD**

MSMA 1.0kW to 1.5kW, MDMA 1.0kW to 1.5kW
MHMA 500W to 1.5kW, MFMA 400W to 1.5kW
MGMA 900W

Fig. 4-1



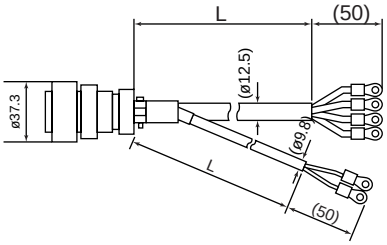
Title		Part No.	Manufacturer
Straight plug		JL04V-6A20-18SE-EB-R	Japan Aviation Electronics Ind.
Cable clamp		JL04-2022CK(14)-R	
Rod terminal		AI2.5-8BU	Phoenix
Nylon insulated round terminal	Earth	N2-M4	J.S.T Mfg. Co., Ltd.
	Brake	N1.25-M4	
Cable		ROBO-TOP 600V 0.75mm² and ROBO-TOP 600V 2.0mm²	Daiden Co.,Ltd.

L(m)	Part No.
3	MFMCA0032FCD
5	MFMCA0052FCD
10	MFMCA0102FCD
20	MFMCA0202FCD

MFMCA02FCT**

MSMA 2.0kW, MDMA 2.0kW

Fig. 4-2



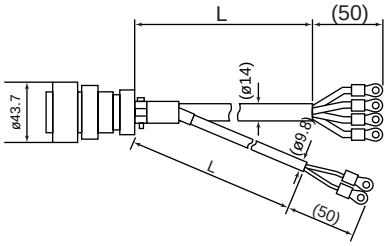
Title		Part No.	Manufacturer
Straight plug		JL04V-6A20-18SE-EB-R	Japan Aviation Electronics Ind.
Cable clamp		JL04-2022CK(14)-R	
Nylon insulated round terminal	Earth	N2-5	J.S.T Mfg. Co., Ltd.
	Brake	N1.25-M4	
Cable		ROBO-TOP 600V 0.75mm² and ROBO-TOP 600V 2.0mm²	Daiden Co.,Ltd.

L(m)	Part No.
3	MFMCA0032FCT
5	MFMCA0052FCT
10	MFMCA0102FCT
20	MFMCA0202FCT

MFMCA03FCT**

MSMA 3.0kW to 5.0kW, MDMA 3.0kW to 5.0kW
MHMA 2.0kW to 5.0kW, MFMA 2.5kW to 4.5kW
MGMA 2.0kW to 4.5kW

Fig. 4-3



Title		Part No.	Manufacturer
Straight plug		JL04V-6A24-11SE-EB-R	Japan Aviation Electronics Ind.
Cable clamp		JL04-2428CK(17)-R	
Nylon insulated round terminal	Earth	N5.5-5	J.S.T Mfg. Co., Ltd.
	Brake	N1.25-M4	
Cable		ROBO-TOP 600V 0.75mm² and ROBO-TOP 600V 3.5mm²	Daiden Co.,Ltd.

L(m)	Part No.
3	MFMCA0033FCT
5	MFMCA0053FCT
10	MFMCA0103FCT
20	MFMCA0203FCT

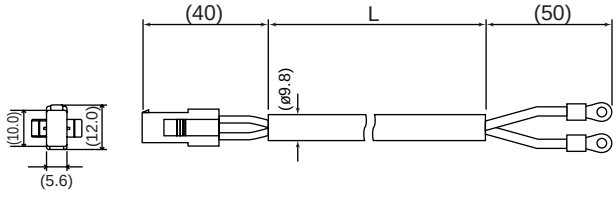
Junction Cable for Brake (ROBO-TOP® 105˚C 600V·DP)

ROBO-TOP® is a trade mark of Daiden Co.,Ltd.

MFMCB00GET**

MSMD 50W to 750W
MQMA 100W to 400W
MAMA 100W to 750W

Fig. 5-1



Title	Part No.	Manufacturer
Connector	172157-1	Tyco Electronics AMP
Connector pin	170366-1,170362-1	
Nylon insulated round terminal	N1.25-M4	J.S.T Mfg. Co., Ltd.
Cable	ROBO-TOP 600V 0.75mm²	Daiden Co.,Ltd.

L(m)	Part No.
3	MFMCB0030GET
5	MFMCB0050GET
10	MFMCB0100GET
20	MFMCB0200GET

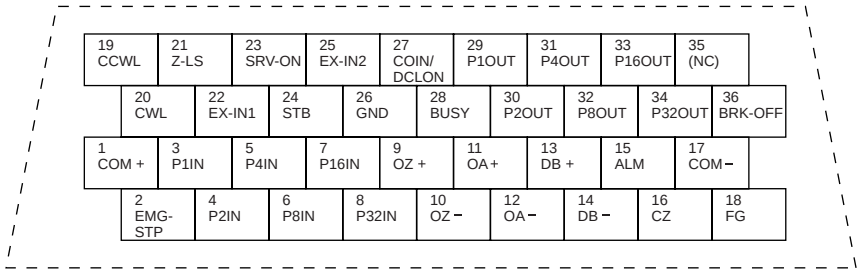
Connector Kit for External Peripheral Equipments

1) Par No. **DV0P4350**

2) Components

Title	Part No.	Quantity	Manufacturer	Note
Connector	54306-3611 or 54306-3619 (lead-free)	1	Molex Inc.	For CN X5 (36-pins)
Connector cover	54331-0361	1		

3) Pin disposition (36 pins) (viewed from the soldering side)



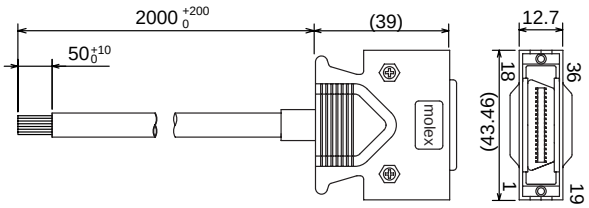
<Cautions>

1) Check the stamped pin-No. on the connector body while making a wiring.
2) For the function of each signal title or its symbol, refer to the wiring example of the connector CN I/F.
3) Check the stamped pin-No. on the connector body while making a wiring.

Interface Cable

1) Par No. **DV0P4510**

2) Dimensions



<Remarks>
Color designation of the cable
e.g.) Pin-1 Cable color : Orange
(Red1) : One red dot on the cable

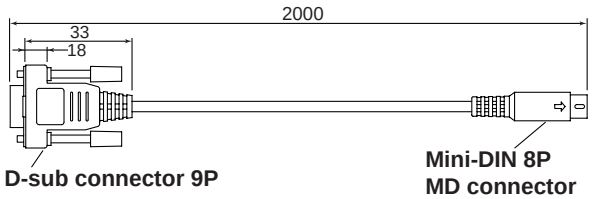
3) Table for wiring

Cable of 2m is connected.

Pin No.	color	Pin No.	color	Pin No.	color
1	Orange (Red1)	13	Gray (Red2)	25	White (Red3)
2	Orange (Black1)	14	Gray (Black2)	26	White (Black3)
3	Gray (Red1)	15	White (Red2)	27	Yellow (Red3)
4	White (Red1)	16	White (Black2)	28	Yellow (Black3)
5	White (Black1)	17	Yellow (Red2)	29	Pink (Red3)
6	Gray (Black1)	18	Yellow (Black2)	30	Pink (Black3)
7	Yellow (Red1)	19	Pink (Red2)	31	Orange (Red4)
8	Yellow (Black1)	20	Pink (Black2)	32	Orange (Black4)
9	Pink (Red1)	21	Orange (Red3)	33	Gray (Red4)
10	Pink (Black1)	22	Orange (Black3)	34	Gray (Black4)
11	Orange (Red2)	23	Gray (Red3)	35	White (Red4)
12	Orange (Black2)	24	Gray (Black3)	36	White (Black4)

Communication Cable (for connection to PC)

1) Par No. **DV0P1960** **(DOS/V machine)**



Setup Support Software “PANATERM®”

1) Part No. **DV0P4460** **(English/Japanese version)**
2) Supply media : CD-ROM

<Caution>
For setup circumstance, refer to the Instruction Manual of [PANATERM®].

Options

Connector Kit for Motor/Encoder Connection

These are required when you make your own encoder and motor cables.

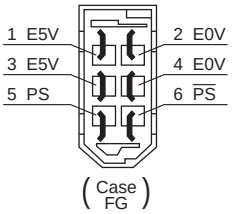
•Applicable motor models : **MSMD 50W to 750W**
MQMA 100W to 400W
MAMA 100W to 750W
[**17-bit absolute**] [For brake, purchase our optional brake cable.]

1) Part No. **DV0P4290**

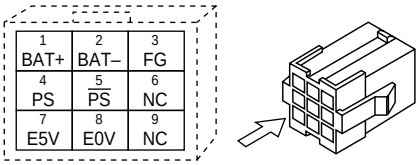
2) Components

Title	Part No.	Number	Manufacturer	Note
Connector	55100-0600 or 55100-0670 (lead-free)	**1**	Molex Inc.	For CN X6 (6-pins)
Connector	172161-1	**1**	Tyco Electronics AMP	For junction cable to encoder (9-pins)
Connector pin	170365-1	**9**		
Connector	172159-1	**1**	Tyco Electronics AMP	For junction cable to motor (4-pins)
Connector pin	170366-1	**4**		

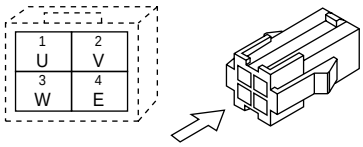
3) Pin disposition of connector, CN X6



4) Pin disposition of junction cable for encoder



5) Pin disposition of junction cable for motor power



*When you connect the battery for absolute encoder, refer to P.138, "When you make your own cable for 17-bit absolute encoder"

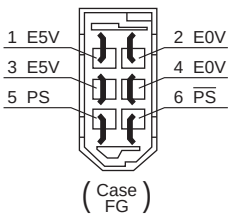
•Applicable motor models : **MSMD 50W to 750W**
MQMA 100W to 400W
MAMA 100W to 750W
[**2500P/r incremental encoder**] [For brake, purchase our optional brake cable.]

1) Part No. **DV0P4380**

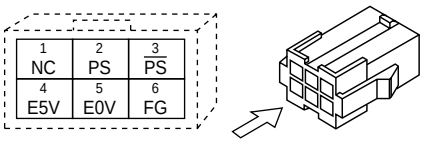
2) Components

Title	Part No.	Number	Manufacturer	Note
Connector	55100-0600 or 55100-0670 (lead-free)	1	Molex Inc.	For CN X6 (6-pins)
Connector	172160-1	1	Tyco Electronics AMP	For junction cable to encoder (6-pins)
Connector pin	170365-1	6		
Connector	172159-1	1	Tyco Electronics AMP	For junction cable to encoder (4-pins)
Connector pin	170366-1	4		

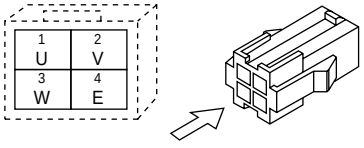
3) Pin disposition of connector, CN X6



4) Pin disposition of junction cablefor encoder



5) Pin disposition of junction cable for motor power



For DVOP2490, DV0P3480,
• recommended manual crimp tool
(to be prepared by customer)

Title	Part No.	Manufacturer
For junction cable to encoder	755330 - 1	Tyco Electronics AMP
For junction cable to motor	755331 - 1	

•**Applicable motor models :** **MSMA 1.0kW to 2.0kW**
MDMA 1.0kW to 2.0kW
MHMA 500W to 1.5kW
MGMA 900W
[**17-bit absolute incremental encoder, 2500P/r incremental encoder**] Without brake

1) Part No. **DV0P4310**

2) Components

Title	Part No.	Number	Manufacturer	Note
Connector	55100-0600 or 55100-0670 (lead-free)	1	Molex Inc.	For CN X6 (6-pins)
Straight plug	N/MS3106B20-29S	1	Japan Aviation Electronics Industry Ltd.	For junction cable to encoder
Cable clamp	N/MS3057-12A	1		
Straight plug	N/MS3106B20-4S	1	Japan Aviation Electronics Industry Ltd.	For junction cable to motor power
Cable clamp	N/MS3057-12A	1		

•**Applicable motor models :** **MSMA 3.0kW to 5.0kW**
MDMA 3.0kW to 5.0kW
MHMA 2.0kW to 5.0kW
MGMA 2.0kW to 4.5kW
[**17-bit absolute incremental encoder, 2500P/r incremental encoder**] Without brake

1) Part No. **DV0P4320**

2) Components

Title	Part No.	Number	Manufacturer	Note
Connector	55100-0600 or 55100-0670 (lead-free)	1	Molex Inc.	For CN X6 (6-pins)
Straight plug	N/MS3106B-20-29S	1	Japan Aviation Electronics Industry Ltd.	For junction cable to encoder
Cable clamp	N/MS3057-12A	1		
Straight plug	N/MS3106B22-22S	1	Japan Aviation Electronics Industry Ltd.	For junction cable to motor power
Cable clamp	N/MS3057-12A	1		

•**Applicable motor models :** **MSMA 1.0kW to 2.0kW**
MDMA 1.0kW to 2.0kW
MHMA 0.5kW to 1.5kW
MGMA 900W
[**17-bit absolute incremental encoder, 2500P/r incremental encoder**] With brake

MFMA 0.4kW to 1.5kW
[**17-bit absolute incremental encoder, 2500P/r incremental encoder**] Without brake / With brake

1) Part No. **DV0P4330**

2) Components

Title	Part No.	Number	Manufacturer	Note
Connector	55100-0600 or 55100-0670 (lead-free)	1	Molex Inc.	For CN X6 (6-pins)
Straight plug	N/MS3106B20-29S	1	Japan Aviation Electronics Industry Ltd.	For junction cable to encoder
Cable clamp	N/MS3057-12A	1		
Straight plug	N/MS3106B20-18S	1	Japan Aviation Electronics Industry Ltd.	For junction cable to motor power
Cable clamp	N/MS3057-12A	1		

•**Applicable motor models :** **MSMA 3.0kW to 5.0kW**
MDMA 3.0kW to 5.0kW
MHMA 2.0kW to 5.0kW
MGMA 2.0kW to 4.5kW
[**17-bit absolute incremental encoder, 2500P/r incremental encoder**] With brake

MFMA 2.5kW to 4.5kW
[**17-bit absolute incremental encoder, 2500P/r incremental encoder**] Without brake / With brake

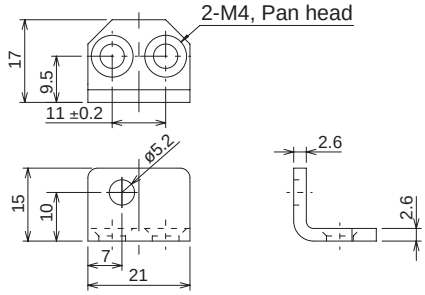
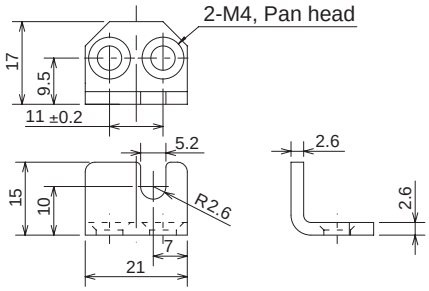
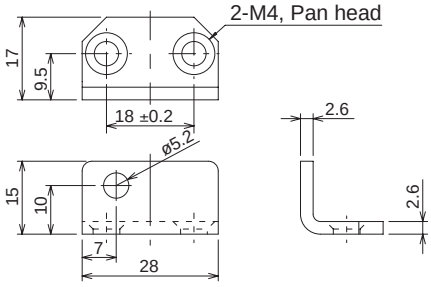
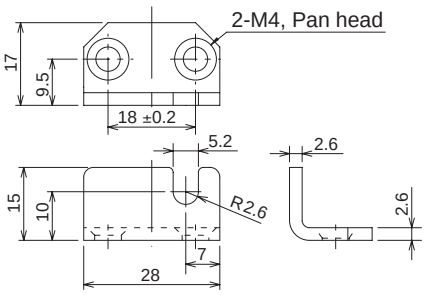
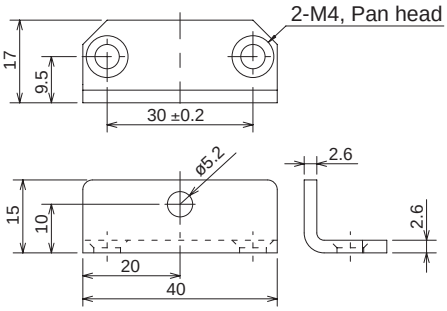
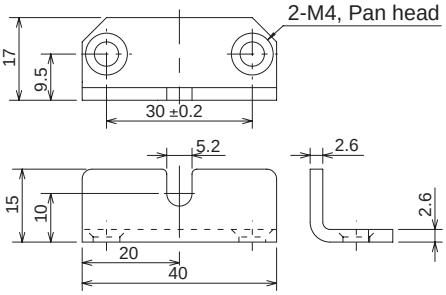
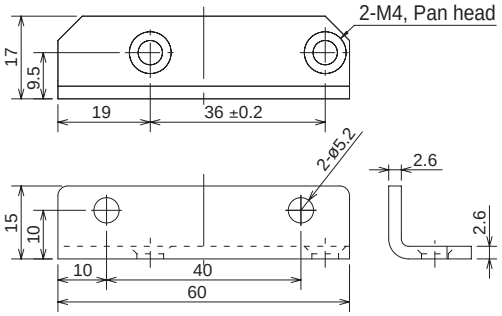
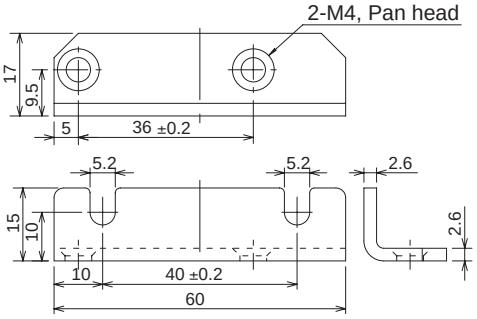
1) Part No. **DV0P4340**

2) Components

Title	Part No.	Number	Manufacturer	Note
Connector	55100-0600 or 55100-0670 (lead-free)	1	Molex Inc.	For CN X6 (6-pins)
Straight plug	N/MS3106B20-29S	1	Japan Aviation Electronics Industry Ltd.	For junction cable to encoder
Cable clamp	N/MS3057-12A	1		
Straight plug	N/MS3106B24-11S	1	Japan Aviation Electronics Industry Ltd.	For junction cable to motor power
Cable clamp	N/MS3057-16A	1		

Options

Mounting Bracket

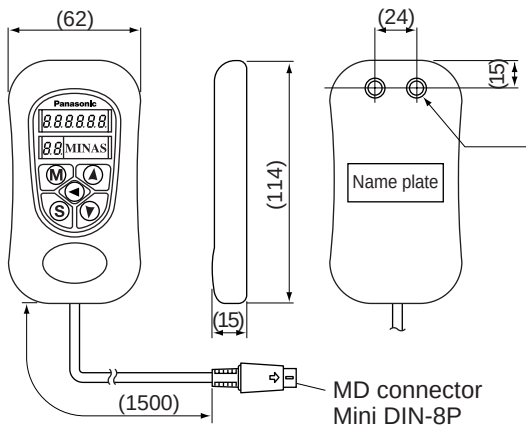
Frame symbol of applicable driver	part No.	Mounting screw	Dimensions	
			Upper side	Bottom side
A-frame	**DV0P 4271**	M4 x L6 Pan head 4pcs		
B-frame	**DV0P 4272**	M4 x L6 Pan head 4pcs		
C-frame	**DV0P 4273**	M4 x L6 Pan head 4pcs		
D-frame	**DV0P 4274**	M4 x L6 Pan head 4pcs		

<Caution>

For E and F-frame, you con make a front end and back end mounting by changing the mounting direction of L-shape bracket (attachment).

Console

Part No. **DV0P4420**



Reactor

Fig.1

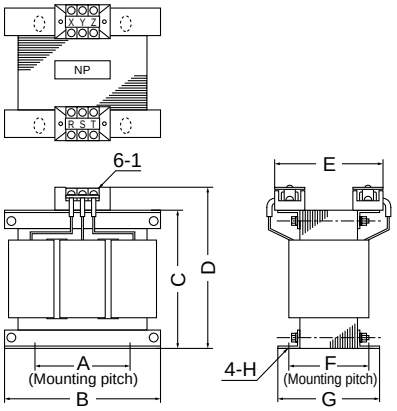
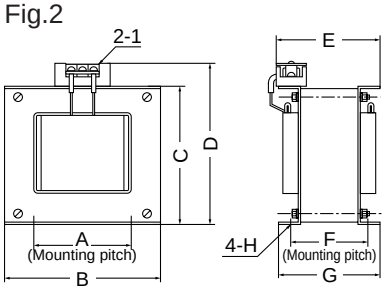


Fig.2



	Part No.	A	B	C	D	E	F	G	H	I	Inductance (mH)	Rated current (A)
Fig.1	**DV0P220**	65	125	83	118	145	70	85	7(w) x 12(L)	M4	6.81	3
	DV0P221	60	150	113	137	120	60	75	7(w) x 12(L)	M4	4.02	5
	DV0P222	60	150	113	137	130	70	95	7(w) x 12(L)	M4	2	8
	DV0P223	60	150	113	137	140	79	95	7(w) x 12(L)	M4	1.39	11
	DV0P224	60	150	113	137	145	84	100	7(w) x 12(L)	M4	0.848	16
	DV0P225	60	150	113	137	160	100	115	7(w) x 12(L)	M5	0.557	25
Fig.2	**DV0P226**	55	80	68	90	90	41	55	ø7.0	M4	6.81	3
	DV0P227	55	80	68	90	90	41	55	ø7.0	M4	4.02	5
	DV0P228	55	80	68	90	95	46	60	ø7.0	M4	2	8
	DV0P229	55	80	68	90	105	56	70	ø7.0	M4	1.39	11

Motor series	Power supply	Rated output	Part No.
MSMD	Single phase, 100V	50W to 100W	DV0P227
MQMA		100W	
MSMD		200W to 400W	DV0P228
MQMA			
MSMD	Single phase, 200V	50W to 200W	DV0P220
MQMA		100W to 200W	
MAMA			
MFMA		400W	
MHMA		500W	
MSMD		400W to 750W	DV0P221
MQMA		400W	
MAMA		400W to 750W	
MAMA	3-phase, 200V	400W	DV0P220
MFMA			
MHMA		500W	
MSMD		750W	DV0P221
MAMA			

Motor series	Power supply	Rated output	Part No.
MGMA	3-phase, 200V	900W	DV0P222
MSMA		1.0kW 1.5kW	
MDMA			
MHMA			
MFMA		1.5kW	
MSMA		2.0kW	DV0P223
MDMA			
MHMA			
MGMA			
MFMA		2.5kW	DV0P224
MSMA		3.0kW	
MDMA			
MHMA			
MGMA			
MSMA		4.0kW	DV0P225
MDMA			
MHMA			

Harmonic restraint

On September, 1994, “Guidelines for harmonic restraint on heavy consumers who receive power through high voltage system or extra high voltage system” and “Guidelines for harmonic restraint on household electrical appliances and general-purpose articles” established by the Agency for Natural Resources and Energy of the Ministry of Economy, Trade and Industry (the ex-Ministry of International Trade and Industry). According to those guidelines, the Japan Electrical Manufacturers’ Association (JEMA) have prepared technical documents (procedure to execute harmonic restraint: JEM-TR 198, JEM-TR 199 and JEM-TR 201) and have been requesting the users to understand the restraint and to cooperate with us. On January, 2004, it has been decided to exclude the general-purpose inverter and servo driver from the “Guidelines for harmonic restraint on household electrical appliances and general-purpose articles”. After that, the “Guidelines for harmonic restraint on household electrical appliances and general-purpose articles” was abolished on September 6, 2004.

We are pleased to inform you that the procedure to execute the harmonic restraint on general-purpose inverter and servo driver was modified as follows.

1. All types of the general-purpose inverters and servo drivers used by specific users are under the control of the “Guidelines for harmonic restraint on heavy consumers who receive power through high voltage system or extra high voltage system”. The users who are required to apply the guidelines must calculate the equivalent capacity and harmonic current according to the guidelines and must take appropriate countermeasures if the harmonic current exceeds a limit value specified in a contract demand. (Refer to JEM-TR 210 and JEM-TR 225.)
2. The “Guidelines for harmonic restraint on household electrical appliances and general-purpose articles” was abolished on September 6, 2004. However, based on conventional guidelines, JEMA applies the technical documents JEM-TR 226 and JEM-TR 227 to any users who do not fit into the “Guidelines for harmonic restraint on heavy consumers who receive power through high voltage system or extra high voltage system” from a perspective on enlightenment on general harmonic restraint. The purpose of these guidelines is the execution of harmonic restraint at every device by a user as usual to the utmost extent.

Options

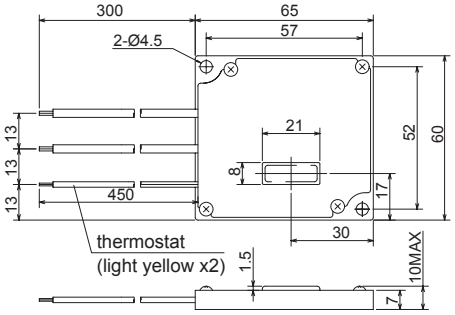
External Regenerative Resistor

Part No.	Manufacturer's part No.	Specifications					Activation temperature of built-in thermostat
		Resistance	Rated power (reference) *				
			Free air	with fan [W]			
		Ω	[W]	1m/s	2m/s	3m/s	
DV0P4280	RF70M	50	10	25	35	45	140±5˚C B-contact Open/Close capacity (resistance load) 4A 125VAC 10000 times 2.5A 250VAC 10000 times
DV0P4281	RF70M	100	10	25	35	45	
DV0P4282	RF18B	25	17	50	60	75	
DV0P4283	RF18B	50	17	50	60	75	
DV0P4284	RF240	30	40	100	120	150	
DV0P4285	RH450F	20	52	130	160	200	

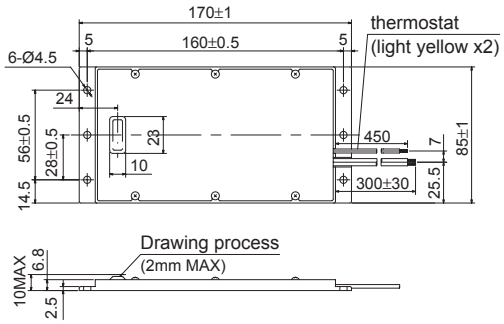
Manufacturer : Iwaki Musen Kenkyusho

* Power with which the driver can be used without activating the built-in thermostat.

DV0P4280, DV0P4281

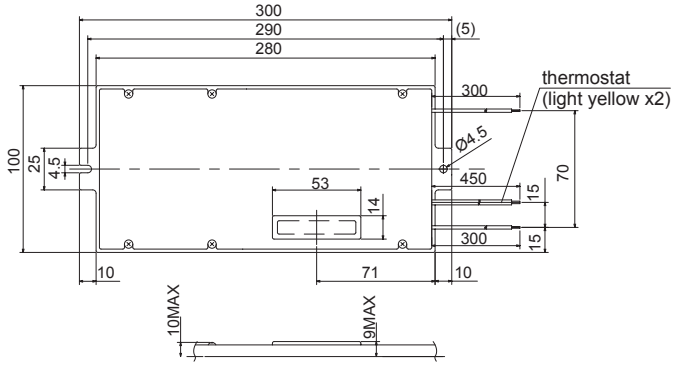


DV0P4282,DV0P4283

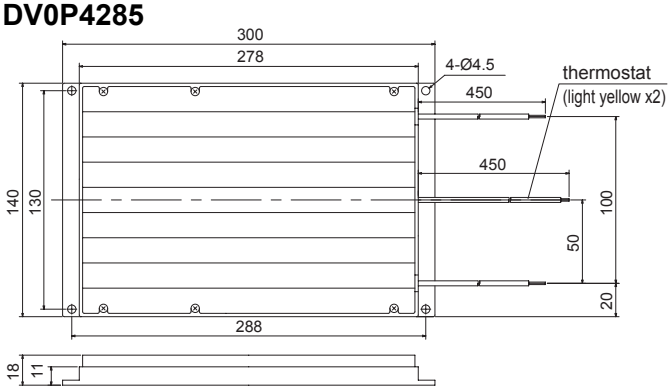


Frame	Power supply	
	Single phase, 100V	Single phase, 200V 3-phase, 200V
A	DV0P4280	DV0P4281
B	DV0P4283	DV0P4283
C	DV0P4282	
D	–	DV0P4284
E		DV0P4285
F		Arrange 2 DV0P4285 in a parallel

DV0P4284



DV0P4285



<Remarks>

Thermal fuse is installed for safety. Compose the circuit so that the power will be turned off when the thermostat is activated. The thermal fuse may blow due to heat dissipating condition, working temperature, supply voltage or load fluctuation.

Make it sure that the surface temperature of the resistor may not exceed 100˚C at the worst running conditions with the machine, which brings large regeneration (such case as high supply voltage, load inertia is large or deceleration time is short) Install a fan for a forced cooling if necessary.

<Caution>

Regenerative resistor gets very hot.

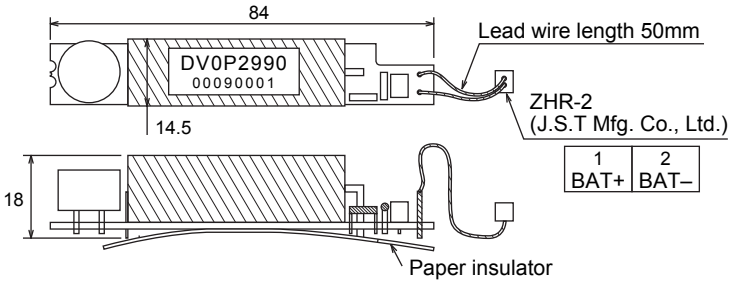
Take preventive measures for fire and burns.
Avoid the installation near inflammable objects, and easily accessible place by hand.

Battery For Absolute Encoder

Battery

(1) Part No. **DV0P2990**

(2) Lithium battery by Toshiba Battery Co.
ER6V, 3.6V 2000mAh



<Caution>

This battery is categorized as hazardous substance, and you may be required to present an application of hazardous substance when you transport by air (both passenger and cargo airlines).

Recommended components [Supplement]

Surge Absorber for Motor Brake

Motor	Surge absorber for motor brake
MSMD 50W to 1.0kW	• C-5A2 or Z15D151 Ishizuka Electronics Co.
MAMA 100W to 750W	
MHMA 2.0kW to 5.0kW	
MGMA 900W to 2.0kW	
MSMA 1.5kW to 5.0kW	• C-5A3 or Z15D151 Ishizuka Electronics Co.
MDMA 4.0kW to 5.0kW	
MFMA 1.5kW	
MGMA 3.0kW to 4.5kW	
MDMA 1.0kW to 3.0kW	• TNR9V820K Nippon Chemi_Con Co.
MFMA 400W	
MFMA 2.5kW to 4.5kW	
MHMA 500W to 1.5kW	

List of Peripheral Equipments (reference only)

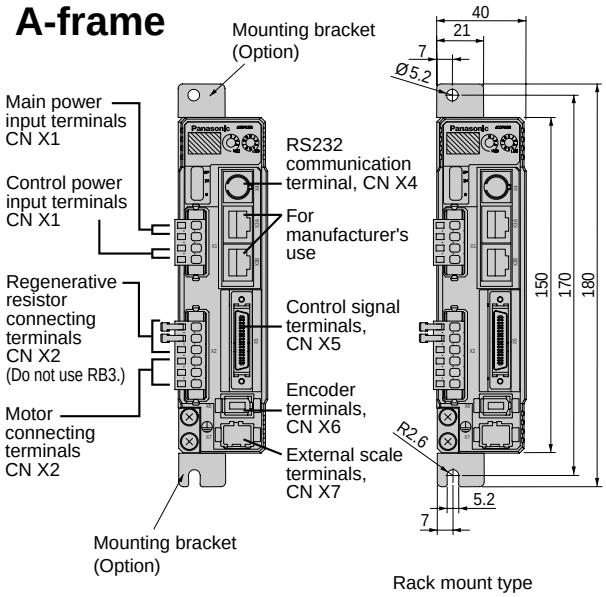
As of Nov.2004

Manufacturer	Tel No./URL	Peripheral components
Automation Controls Company Matsushita Electric Works, Ltd.	81-6-6908-1131 http://www.mew.co.jp	Non-fuse breaker Magnetic contactor Surge absorber
Iwaki Musen Kenkyusho Co., Ltd.	81-44-833-4311 http://www.iwakimusen.co.jp/	Regenerative resistor
Nippon Chemi_Con Corp.	81-3-5436-7608 http://www.chemi_con.co.jp/	Surge absorber for holding brake
Ishizuka Electronics Corp.	81-3-3621-2703 http://www.semitec.co.jp/	
Renesas Technology Corp.	81-6-6233-9511 http://www.renesas.com/jpn/	
TDK Corp.	81-3-5201-7229 http://www.tdk.co.jp/	Noise filter for signal lines
Okaya Electric Industries Co. Ltd.	81-3-3424-8120 http://www.okayatec.co.jp/	Surge absorber Noise filter
Japan Aviation Electronics Industry, Ltd.	81-3-3780-2717 http://www.jae.co.jp	Connector
Sumitomo 3M	81-3-5716-7290 http://www.mmmco.jp	
Tyco Electronics AMP k.k,	81-44-844-8111 http://www.tycoelectronics.com/japan/amp	
Japan Molex Inc.	81-462-65-2313 http://www.molex.co.jp	
Hirose Electric Co., Ltd.	81-3-3492-2161 http://www.hirose.co.jp/	
J.S.T Mfg. Co., Ltd.	81-45-543-1271 http://www.jst-mfg.com/	
Daiden Co., Ltd.	81-3-5805-5880 http://www.dyden.co.jp/	Cable
Mitutoyo Corp.	81-44-813-5410 http://www.mitutoyo.co.jp	External scale

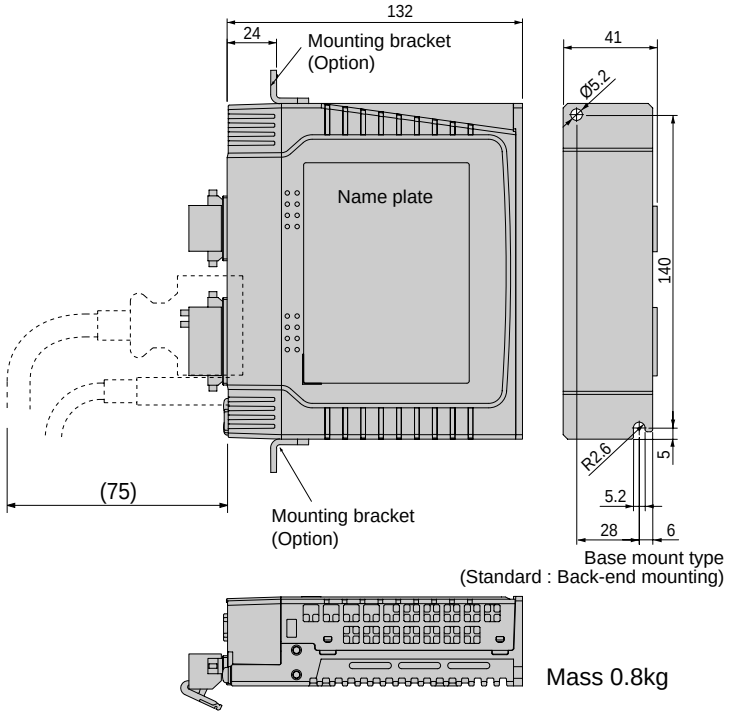
* The above list is for reference only. We may change the manufacturer without notice.

Dimensions (Driver)

A-frame



Rack mount type
(Option : Front-end mounting)



Base mount type
(Standard : Back-end mounting)

Mass 0.8kg

Connector at driver side

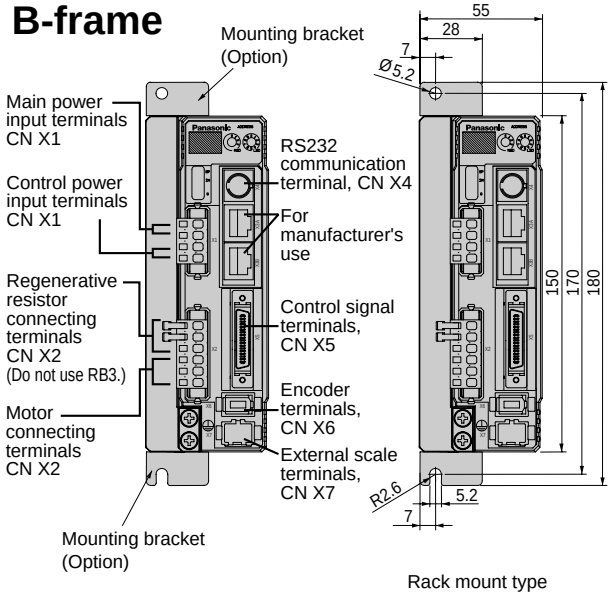
Connector sign	Connector type	Manufacturer
CNX7	53460-0629 (or equivalent)	Molex Inc.
CNX6	53460-0629 (or equivalent)	Molex Inc.
CNX5	529863679 (or equivalent)	Molex Inc.
CNX4	MD-S8000-10 (or equivalent)	J.S.T. Mfg.Co., Ltd.
CNX3B	855050013 (or equivalent)	Molex Inc.
CNX3A	855050013 (or equivalent)	Molex Inc.
CNX2	S06B-F32SK-GGXR (or equivalent)	J.S.T. Mfg.Co., Ltd.
CNX1	S04B-F32SK-GGXR (or equivalent)	J.S.T. Mfg.Co., Ltd.

Connector at Power Supply and motor side (which comes with the driver)

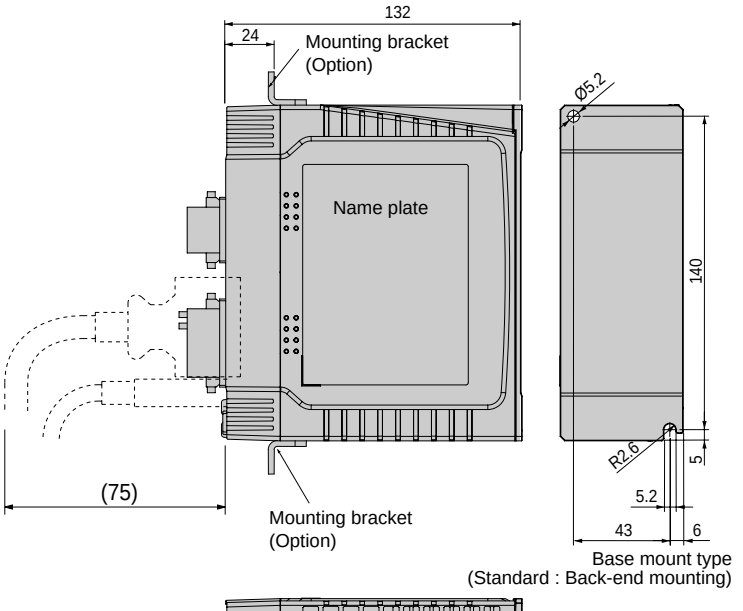
Connector sign	Connector type	Manufacturer
CNX2	06JFAT-SAXGF (or equivalent)	J.S.T. Mfg.Co., Ltd.
CNX1	04JFAT-SAXGF (or equivalent)	J.S.T. Mfg.Co., Ltd.

* Refer to P.188, "Mounting bracket for driver"of Options, when you use the optional mounting bracket.

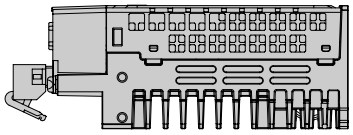
B-frame



Rack mount type
(Option : Front-end mounting)



Base mount type
(Standard : Back-end mounting)



Mass 1.1kg

Connector at driver side

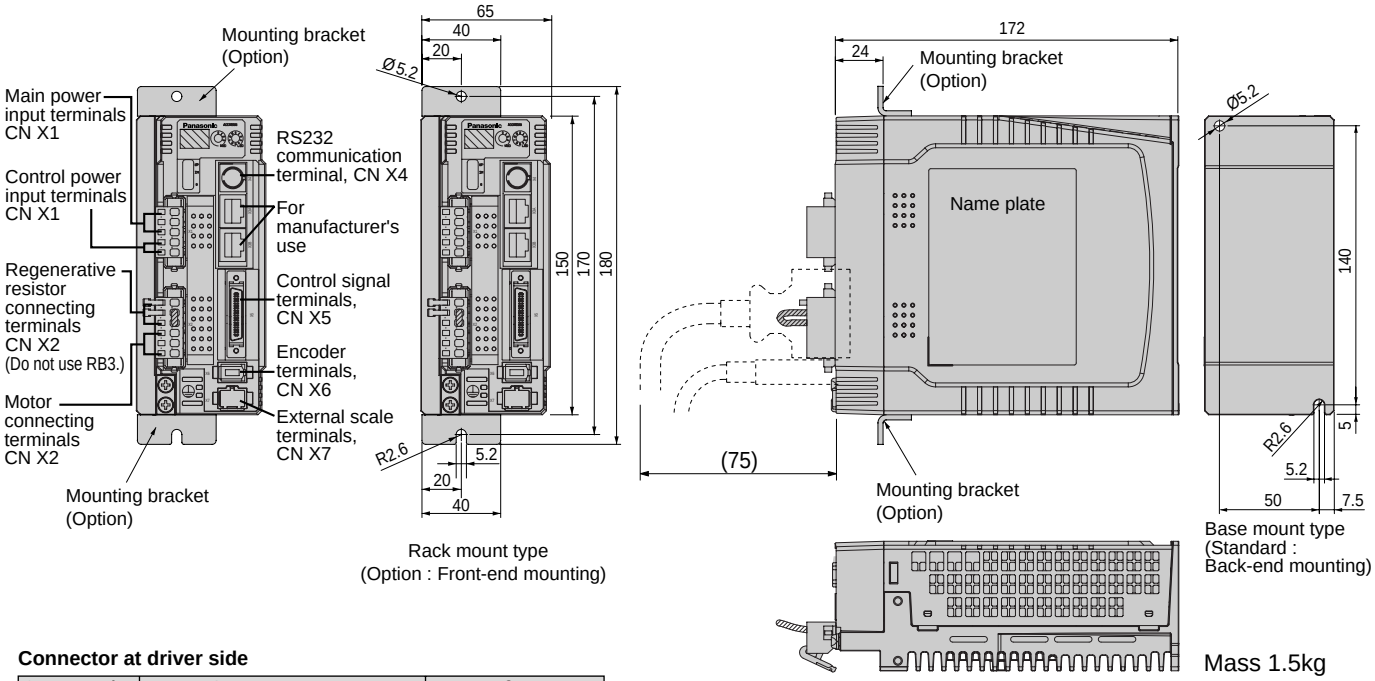
Connector sign	Connector type	Manufacturer
CNX7	53460-0629 (or equivalent)	Molex Inc.
CNX6	53460-0629 (or equivalent)	Molex Inc.
CNX5	529863679 (or equivalent)	Molex Inc.
CNX4	MD-S8000-10 (or equivalent)	J.S.T. Mfg.Co., Ltd.
CNX3B	855050013 (or equivalent)	Molex Inc.
CNX3A	855050013 (or equivalent)	Molex Inc.
CNX2	S06B-F32SK-GGXR (or equivalent)	J.S.T. Mfg.Co., Ltd.
CNX1	S04B-F32SK-GGXR (or equivalent)	J.S.T. Mfg.Co., Ltd.

Connector at Power Supply and motor side (which comes with the driver)

Connector sign	Connector type	Manufacturer
CNX2	06JFAT-SAXGF (or equivalent)	J.S.T. Mfg.Co., Ltd.
CNX1	04JFAT-SAXGF (or equivalent)	J.S.T. Mfg.Co., Ltd.

* Refer to P.188, "Mounting bracket for driver"of Options, when you use the optional mounting bracket.

C-frame



Mass 1.5kg

Connector at driver side

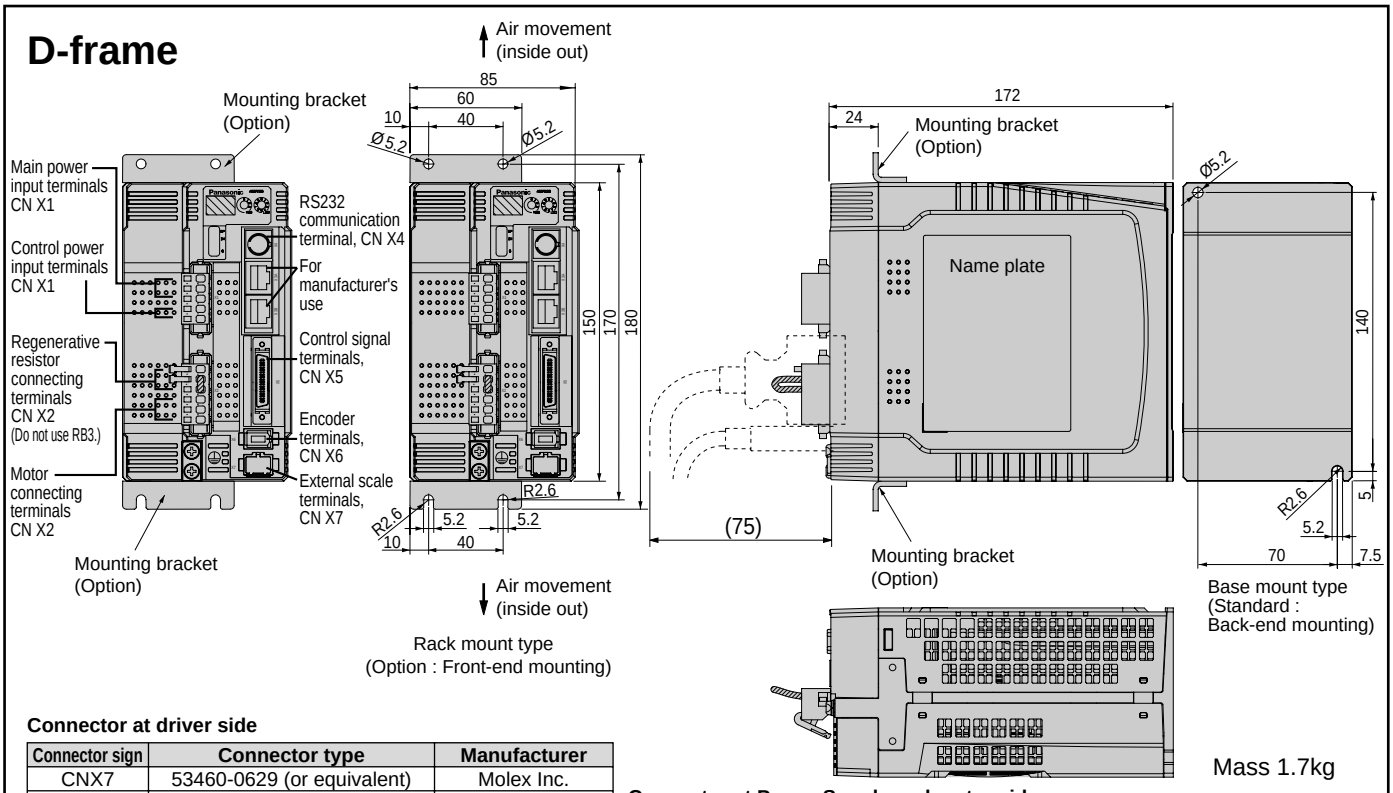
Connector sign	Connector type	Manufacturer
CNX7	53460-0629 (or equivalent)	Molex Inc.
CNX6	53460-0629 (or equivalent)	Molex Inc.
CNX5	529863679 (or equivalent)	Molex Inc.
CNX4	MD-S8000-10 (or equivalent)	J.S.T. Mfg.Co., Ltd.
CNX3B	855050013 (or equivalent)	Molex Inc.
CNX3A	855050013 (or equivalent)	Molex Inc.
CNX2	S06B-F32SK-GGXR (or equivalent)	J.S.T. Mfg.Co., Ltd.
CNX1	S05B-F32SK-GGXR (or equivalent)	J.S.T. Mfg.Co., Ltd.

Connector at Power Supply and motor side (which comes with the driver)

Connector sign	Connector type	Manufacturer
CNX2	06JFAT-SAXGF (or equivalent)	J.S.T. Mfg.Co., Ltd.
CNX1	05JFAT-SAXGF (or equivalent)	J.S.T. Mfg.Co., Ltd.

* Refer to P.188, "Mounting bracket for driver"of Options, when you use the optional mounting bracket.

D-frame



Mass 1.7kg

Connector at driver side

Connector sign	Connector type	Manufacturer
CNX7	53460-0629 (or equivalent)	Molex Inc.
CNX6	53460-0629 (or equivalent)	Molex Inc.
CNX5	529863679 (or equivalent)	Molex Inc.
CNX4	MD-S8000-10 (or equivalent)	J.S.T. Mfg.Co., Ltd.
CNX3B	855050013 (or equivalent)	Molex Inc.
CNX3A	855050013 (or equivalent)	Molex Inc.
CNX2	S06B-F32SK-GGXR (or equivalent)	J.S.T. Mfg.Co., Ltd.
CNX1	S05B-F32SK-GGXR (or equivalent)	J.S.T. Mfg.Co., Ltd.

Connector at Power Supply and motor side (which comes with the driver)

Connector sign	Connector type	Manufacturer
CNX2	06JFAT-SAXGF (or equivalent)	J.S.T. Mfg.Co., Ltd.
CNX1	05JFAT-SAXGF (or equivalent)	J.S.T. Mfg.Co., Ltd.

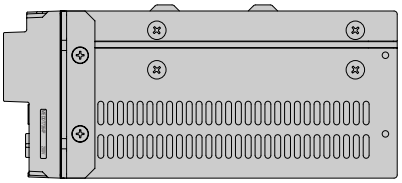
* Refer to P.188, "Mounting bracket for driver"of Options, when you use the optional mounting bracket.

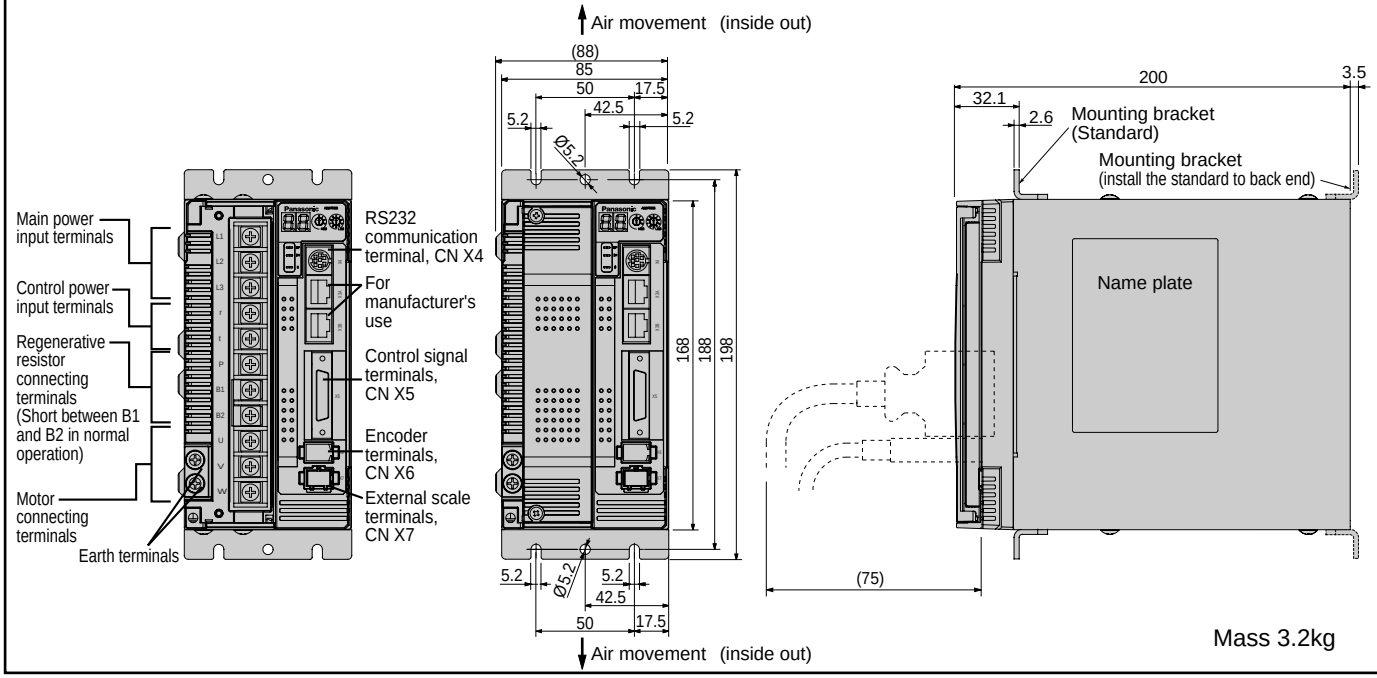
Dimensions (Driver)

E-frame

Connector at driver side

Connector sign	Connector type	Manufacturer
CNX7	53460-0629 (or equivalent)	Molex Inc.
CNX6	53460-0629 (or equivalent)	Molex Inc.
CNX5	529863679 (or equivalent)	Molex Inc.
CNX4	MD-S8000-10 (or equivalent)	J.S.T. Mfg.Co., Ltd.
CNX3B	855050013 (or equivalent)	Molex Inc.
CNX3A	855050013 (or equivalent)	Molex Inc.



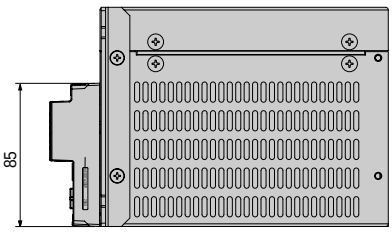


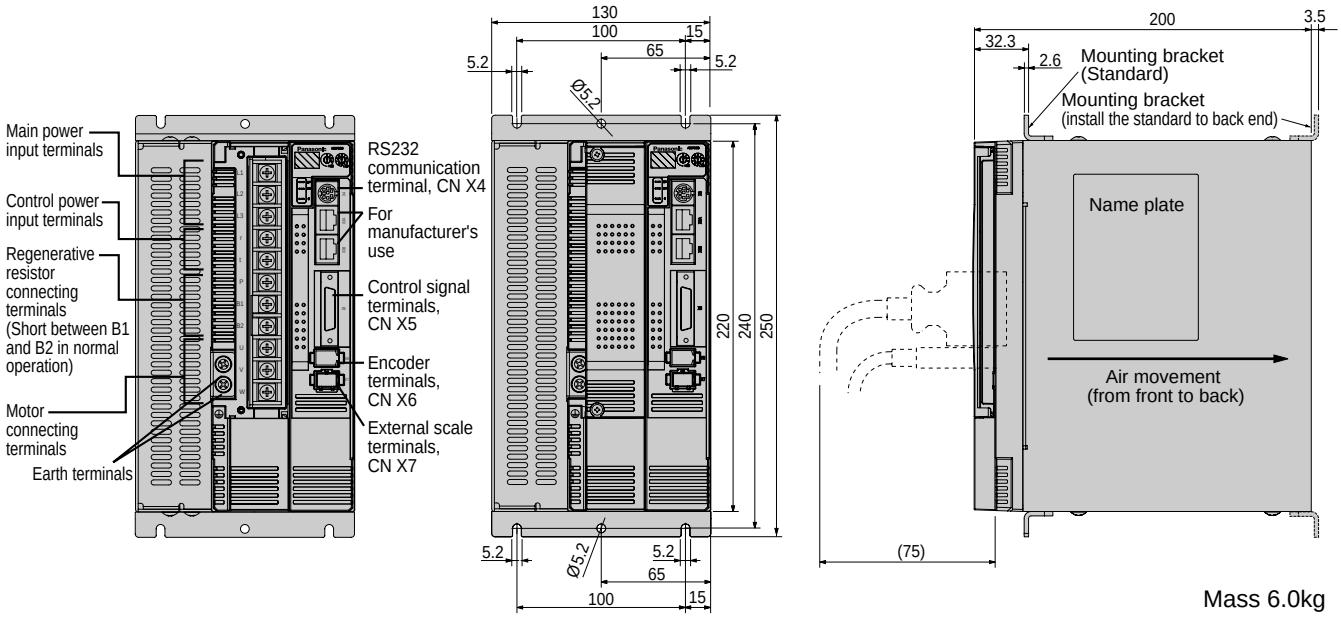
Mass 3.2kg

F-frame

Connector at driver side

Connector sign	Connector type	Manufacturer
CNX7	53460-0629 (or equivalent)	Molex Inc.
CNX6	53460-0629 (or equivalent)	Molex Inc.
CNX5	529863679 (or equivalent)	Molex Inc.
CNX4	MD-S8000-10 (or equivalent)	J.S.T. Mfg.Co., Ltd.
CNX3B	855050013 (or equivalent)	Molex Inc.
CNX3A	855050013 (or equivalent)	Molex Inc.

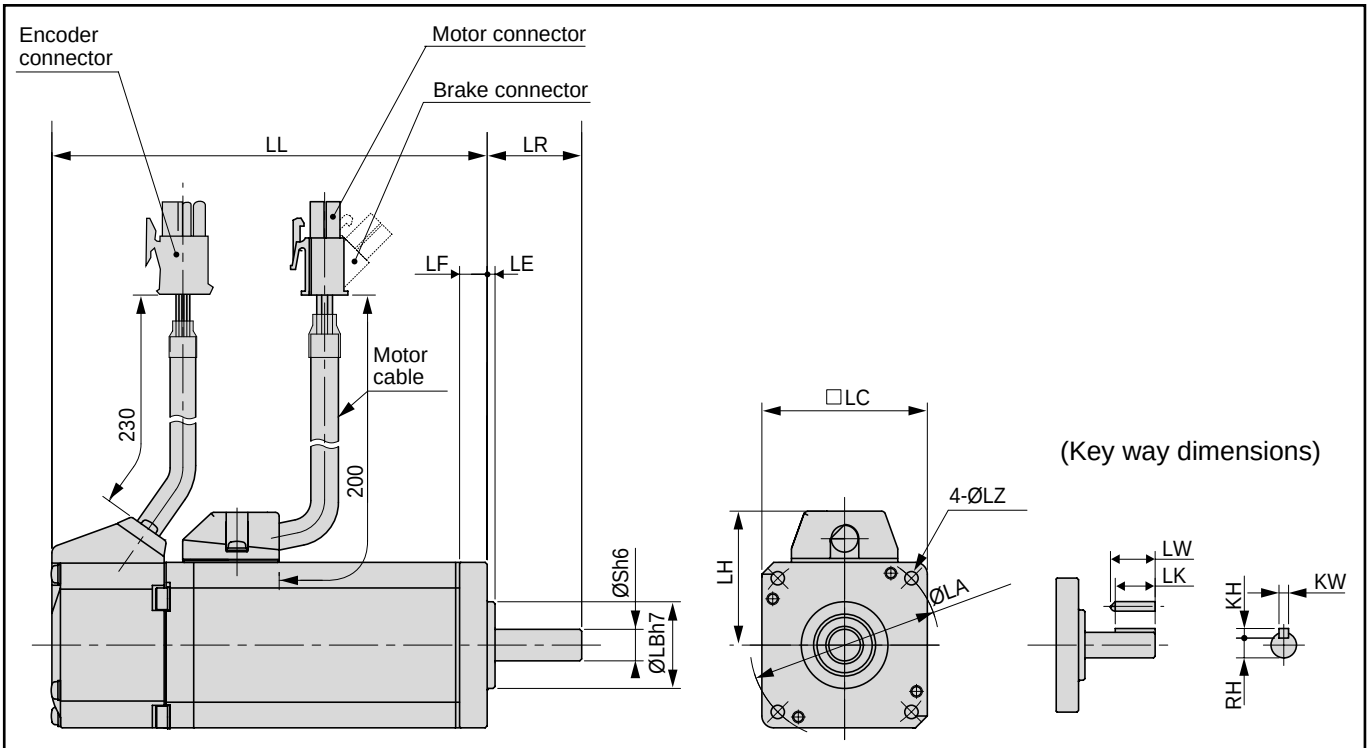




Mass 6.0kg

Dimensions (Motor)

• MAMA 100W to 750W



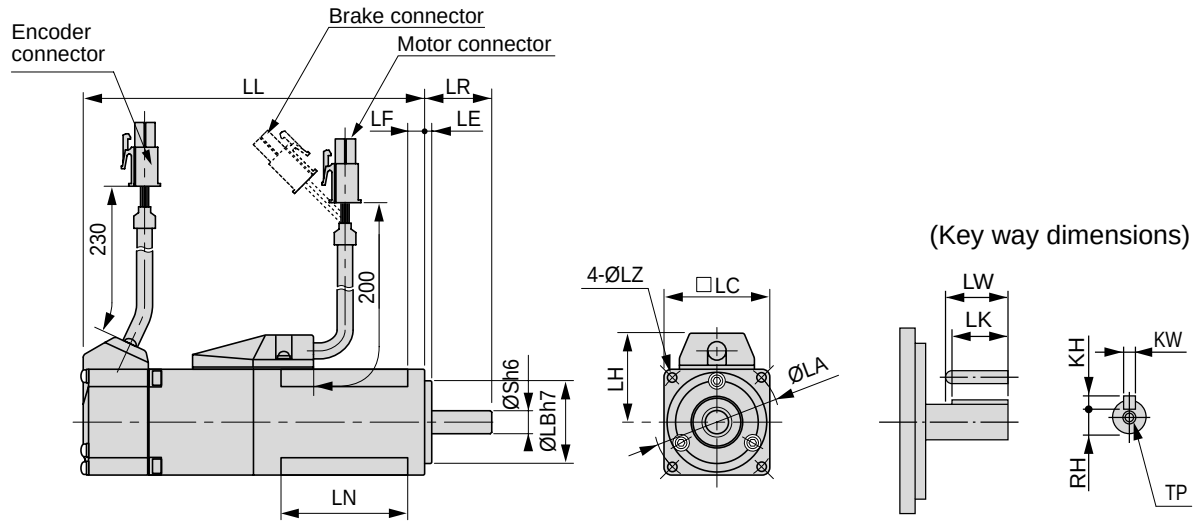
* Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

		MAMA series (Ultra low inertia)							
Motor output		100W		200W		400W		750W	
Motor model	MAMA	012P1 *	012S1 *	022P1 *	022S1 *	042P1 *	042S1 *	082P1 *	082S1 *
Rotary encoder specifications		2500P/r Incremental	17-bit Absolute/ Incremental	2500P/r Incremental	17-bit Absolute/ Incremental	2500P/r Incremental	17-bit Absolute/ Incremental	2500P/r Incremental	17-bit Absolute/ Incremental
LL	Without brake	110.5	127	111	126	139	154	160	175
	With brake	138	154.5	139	154	167	182	192.5	207.5
LR		24		30		30		35	
S		8		11		14		19	
LA		48		70		70		90	
LB		22		50		50		70	
LC		42		60		60		80	
LD		—		—		—		—	
LE		2		3		3		3	
LF		7		7		7		8	
LG		—		—		—		—	
LH		34		43		43		53	
LZ		3.4		4.5		4.5		6	
Key way dimensions	LW	14		20		25		25	
	LK	12.5		18		22.5		22	
	KW	3h9		4h9		5h9		6h9	
	KH	3		4		5		6	
	RH	6.2		8.5		11		15.5	
Mass (kg)	Without brake	0.65	0.71	1.1	1.2	1.5	1.6	3.3	3.4
	With brake	0.85	0.91	1.5	1.6	1.9	2.0	4.0	4.1
Connector/Plug specifications		Refer to P.186, "Options".							

<Cautions>
Reduce the moment of inertia ratio if high speed response operation is required.

Dimensions (Motor)

• MSMD 50W to 100W



* Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

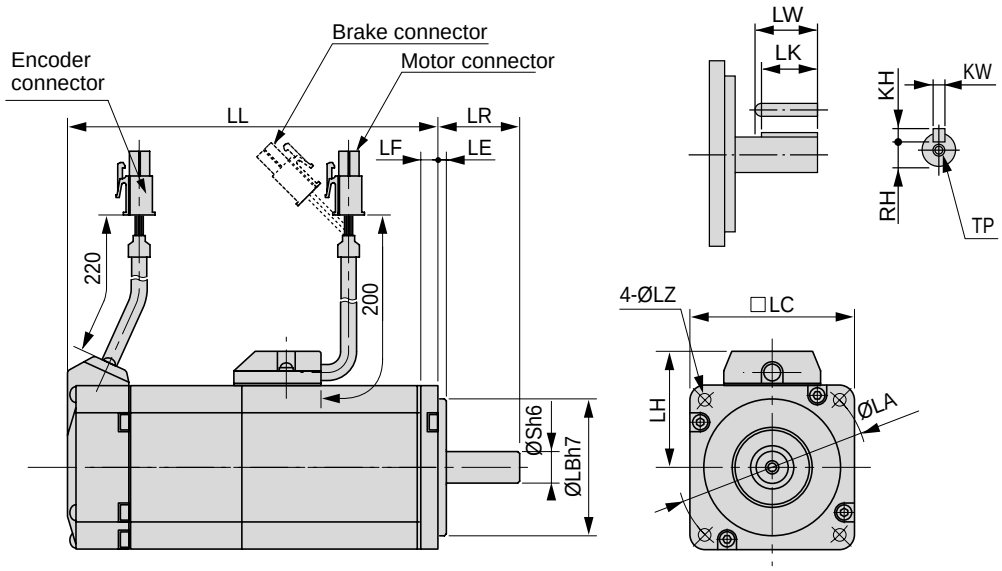
		MSMD series (low inertia)			
Motor output		50W		100W	
Motor model	MSMD	5A * P1 *	5A * S1 *	01 * P1 *	01 * S1 *
Rotary encoder specifications		2500P/r Incremental	17-bit Absolute/ Incremental	2500P/r Incremental	17-bit Absolute/ Incremental
L L	Without brake	72		92	
	With brake	102		122	
L R		25		25	
S		8		8	
L A		45		45	
L B		30		30	
L C		38		38	
L D		—		—	
L E		3		3	
L F		6		6	
L G		—		—	
L H		32		32	
L N		26.5		46.5	
L Z		3.4		3.4	
Key way dimensions	L W	14		14	
	L K	12.5		12.5	
	K W	3h9		3h9	
	K H	3		3	
	R H	6.2		6.2	
	T P	M3 x 6 (depth)		M3 x 6 (depth)	
Mass (kg)	Without brake	0.32		0.47	
	With brake	0.53		0.68	
Connector/Plug specifications		Refer to P.186, "Options".			

<Cautions>

Reduce the moment of inertia ratio if high speed response operation is required.

• MSMD 200W to 750W

(Key way dimensions)



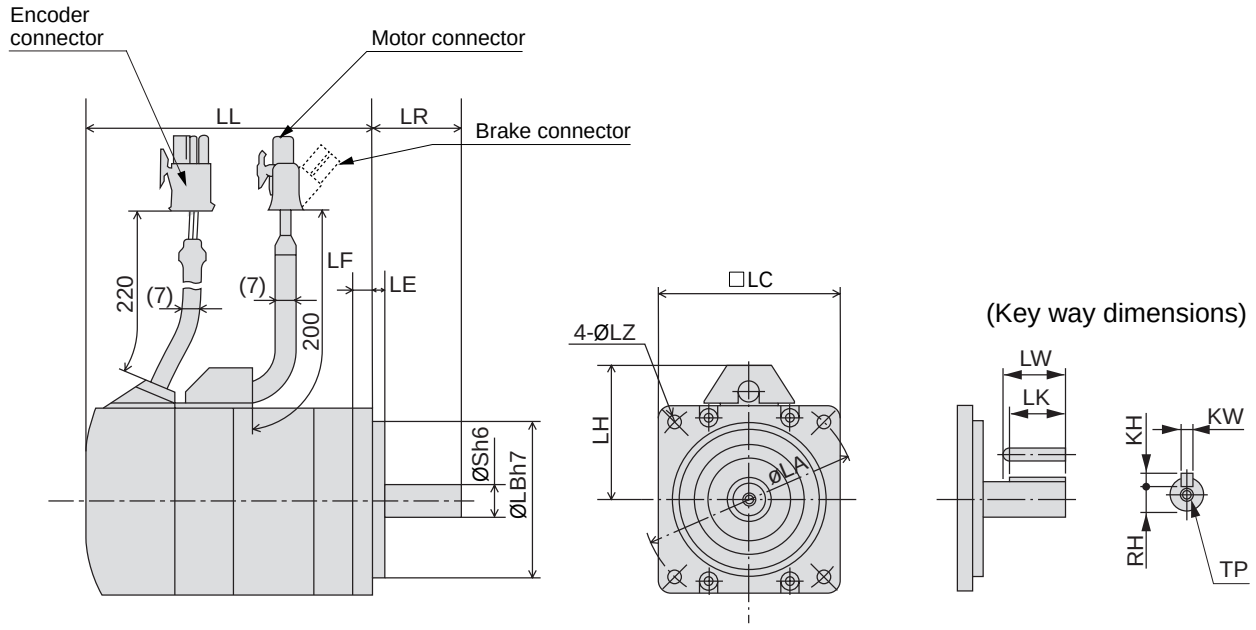
* Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

		MSMD series (low inertia)					
Motor output		200W		400W		750W	
Motor model	MSMD	02 * P1 *	02 * S1 *	04 * P1 *	04 * S1 *	08 * P1 *	08 * S1 *
Rotary encoder specifications		2500P/r Incremental	17-bit Absolute/ Incremental	2500P/r Incremental	17-bit Absolute/ Incremental	2500P/r Incremental	17-bit Absolute/ Incremental
LL	Without brake	79		98.5		112	
	With brake	115.5		135		149	
LR		30		30		35	
S		11		14		19	
LA		70		70		90	
LB		50		50		70	
LC		60		60		80	
LD		—		—		—	
LE		3		3		3	
LF		6.5		6.5		8	
LG		—		—		—	
LH		43		43		53	
LN		—		—		—	
LZ		4.5		4.5		6	
Key way dimensions	LW	20		25		25	
	LK	18		22.5		22	
	KW	4h9		5h9		6h9	
	KH	4		5		6	
	RH	8.5		11		15.5	
	TP	M4 x8 (depth)		M5 x 10 (depth)		M5 x 10 (depth)	
Mass (kg)	Without brake	0.82		1.2		2.3	
	With brake	1.3		1.7		3.1	
Connector/Plug specifications		Refer to P.186, "Options".					

<Cautions>
Reduce the moment of inertia ratio if high speed response operation is required.

Dimensions (Motor)

• MQMA 100W to 400W



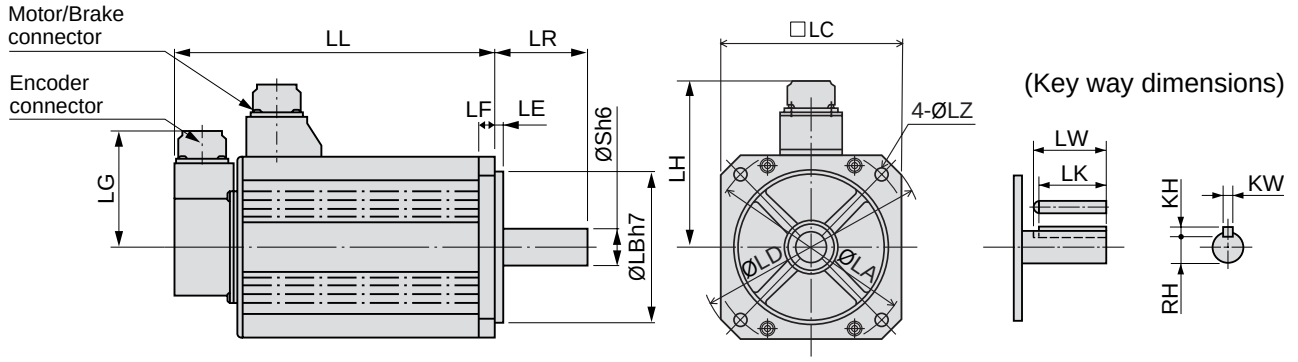
* Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

		MQMA series (low inertia)					
Motor output		100W		200W		400W	
Motor model	MQMA	01 * P1 *	01 * S1 *	02 * P1 *	02 * S1 *	04 * P1 *	04 * S1 *
Rotary encoder specifications		2500P/r Incremental	17-bit Absolute/ Incremental	2500P/r Incremental	17-bit Absolute/ Incremental	2500P/r Incremental	17-bit Absolute/ Incremental
LL	Without brake	60	87	67	94	82	109
	With brake	84	111	99.5	126.5	114.5	141.5
LR		25		30		30	
S		8		11		14	
LA		70		90		90	
LB		50		70		70	
LC		60		80		80	
LD		—		—		—	
LE		3		5		5	
LF		7		8		8	
LG		—		—		—	
LH		43		53		53	
LZ		4.5		5.5		5.5	
Key way dimensions	LW	14		20		25	
	LK	12.5		18		22.5	
	KW	3h9		4h9		5h9	
	KH	3		4		5	
	RH	6.2		8.5		11	
	TP	M3 x 6(depth)		M4 x 8(depth)		M5 x 10(depth)	
Mass (kg)	Without brake	0.65	0.75	1.3	1.4	1.8	1.9
	With brake	0.90	1.00	2.0	2.1	2.5	2.6
Connector/Plug specifications		Refer to P.186, "Options".					

<Cautions>

Reduce the moment of inertia ratio if high speed response operation is required.

• MSMA 1.0kW to 2.0kW



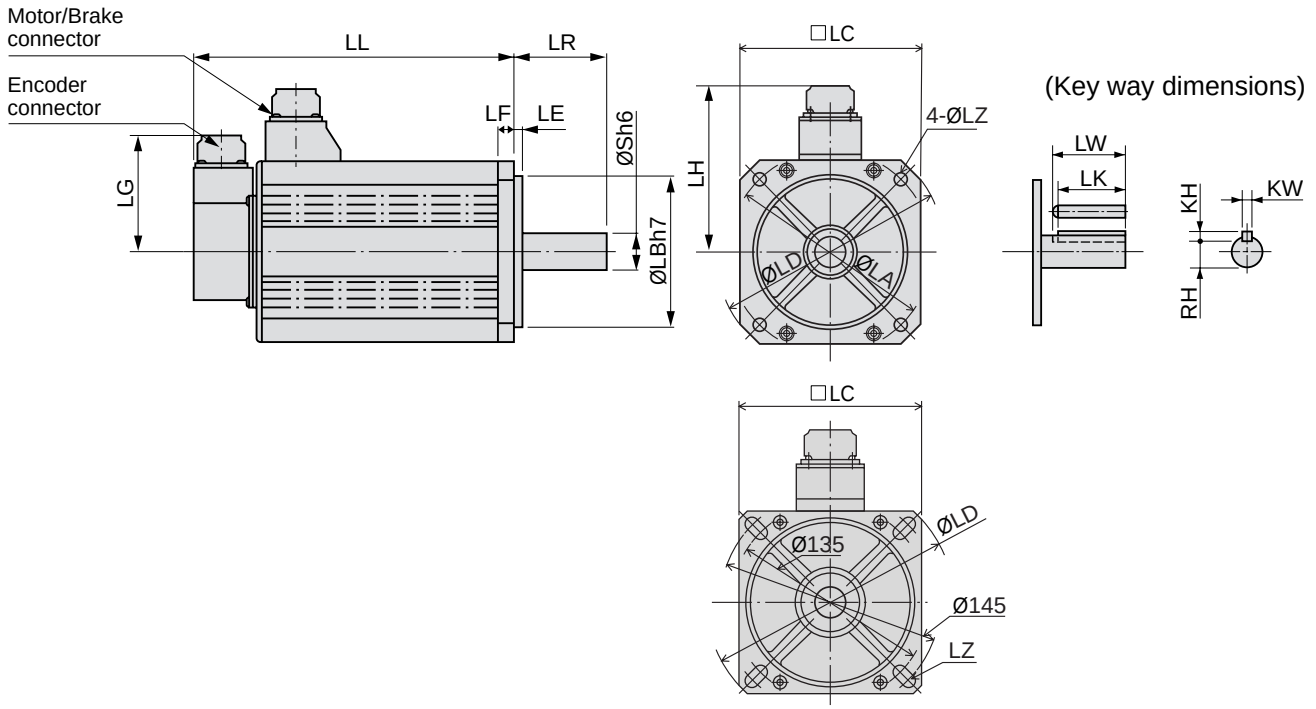
* Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

		MSMA series (low inertia)					
Motor output		1.0kW		1.5kW		2.0kW	
Motor model	MSMA	10 * P1 *	10 * S1 *	15 * P1 *	15 * S1 *	20 * P1 *	20 * S1 *
Rotary encoder specifications		2500P/r Incremental	17-bit Absolute/ Incremental	2500P/r Incremental	17-bit Absolute/ Incremental	2500P/r Incremental	17-bit Absolute/ Incremental
L L	Without brake	175	175	180	180	205	205
	With brake	200	200	205	205	230	230
L R		55		55		55	
S		19		19		19	
L A		100		115		115	
L B		80		95		95	
L C		90		100		100	
L D		120		135		135	
L E		3		3		3	
L F		7		10		10	
L G		84		84		84	
L H		98		103		103	
L Z		6.6		9		9	
Key way dimensions	L W	45		45		45	
	L K	42		42		42	
	K W	6h9		6h9		6h9	
	K H	6		6		6	
	R H	15.5		15.5		15.5	
Mass (kg)	Without brake	4.5	4.5	5.1	5.1	6.5	6.5
	With brake	5.1	5.1	6.5	6.5	7.9	7.9
Connector/Plug specifications		Refer to P.180, "Options".					

<Cautions>
Reduce the moment of inertia ratio if high speed response operation is required.

Dimensions (Motor)

• MSMA 3.0kW to 5.0kW

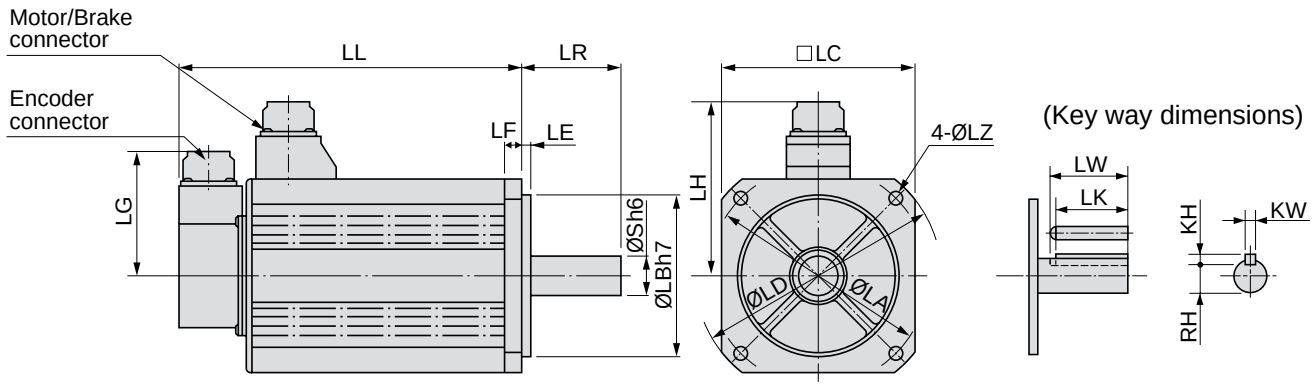


* Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

		MSMA series (low inertia)					
Motor output		3.0kW		4.0kW		5.0kW	
Motor model	MSMA	30 * P1 *	30 * S1 *	40 * P1 *	40 * S1 *	50 * P1 *	50 * S1 *
Rotary encoder specifications		2500P/r Incremental	17-bit Absolute/ Incremental	2500P/r Incremental	17-bit Absolute/ Incremental	2500P/r Incremental	17-bit Absolute/ Incremental
LL	Without brake	217	217	240	240	280	280
	With brake	242	242	265	265	305	305
LR		55		65		65	
S		22		24		24	
LA		130/145 (slot)		145		145	
LB		110		110		110	
LC		120		130		130	
LD		162		165		165	
LE		3		6		6	
LF		12		12		12	
LG		84		84		84	
LH		111		118		118	
LZ		9		9		9	
Key way dimensions	LW	45		55		55	
	LK	41		51		51	
	KW	8h9		8h9		8h9	
	KH	7		7		7	
	RH	18		20		20	
Mass (kg)	Without brake	09.3	9.3	12.9	12.9	17.3	17.3
	With brake	11.0	11.0	14.8	14.8	19.2	19.2
Connector/Plug specifications		Refer to P.180, "Options".					

<Cautions>
Reduce the moment of inertia ratio if high speed response operation is required.

• MDMA 1.0kW to 1.5kW



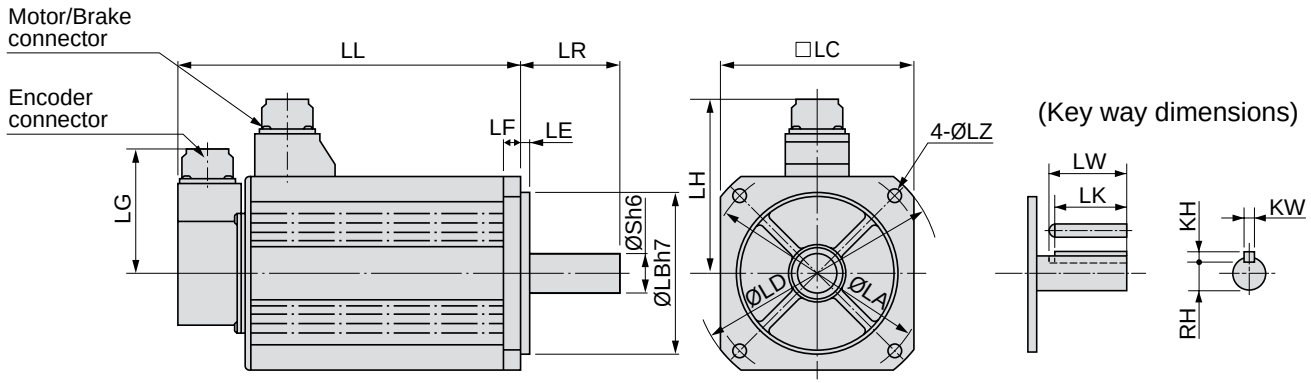
* Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

		MDMA series (Middle inertia)			
Motor output		1.0kW		1.5kW	
Motor model	MDMA	10 * P1 *	10 * S1 *	15 * P1 *	15 * S1 *
Rotary encoder specifications		2500P/r Incremental	17-bit Absolute/Incremental	2500P/r Incremental	17-bit Absolute/Incremental
LL	Without brake	150	150	175	175
	With brake	175	175	200	200
LR		55		55	
S		22		22	
LA		145		145	
LB		110		110	
LC		130		130	
LD		165		165	
LE		6		6	
LF		12		12	
LG		84		84	
LH		118		118	
LZ		9		9	
Key way dimensions	LW	45		45	
	LK	41		41	
	KW	8h9		8h9	
	KH	7		7	
	RH	18		18	
Mass (kg)	Without brake	6.8	6.8	8.5	8.5
	With brake	8.7	8.7	10.1	10.1
Connector/Plug specifications		Refer to P.180, "Options".			

<Cautions>
Reduce the moment of inertia ratio if high speed response operation is required.

Dimensions (Motor)

• MDMA 2.0kW to 3.0kW

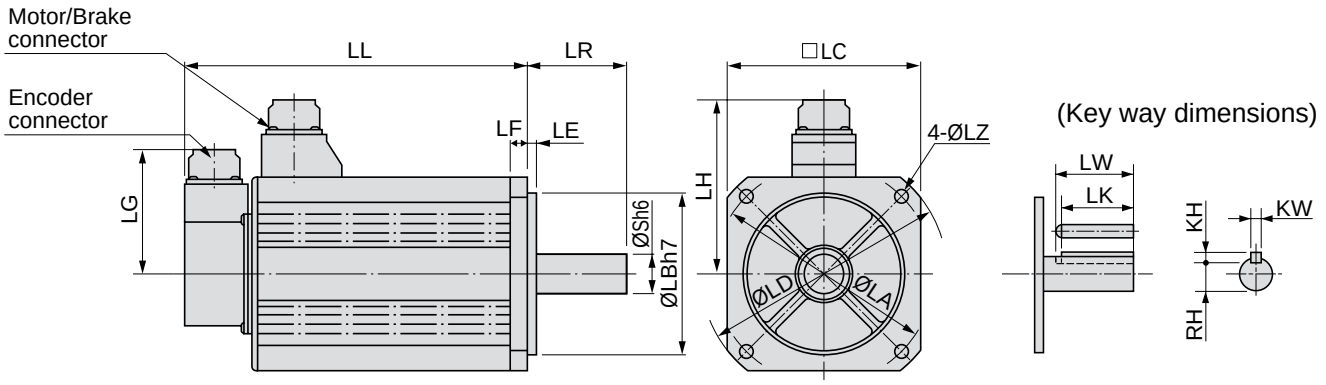


* Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

		MDMA series (Middle inertia)			
Motor output		2.0kW		3.0kW	
Motor model	MDMA	20 * P1 *	20 * S1 *	30 * P1 *	30 * S1 *
Rotary encoder specifications		2500P/r Incremental	17-bit Absolute/Incremental	2500P/r Incremental	17-bit Absolute/Incremental
LL	Without brake	200	200	250	250
	With brake	225	225	275	275
LR		55		65	
S		22		24	
LA		145		145	
LB		110		110	
LC		130		130	
LD		165		165	
LE		6		6	
LF		12		12	
LG		84		84	
LH		118		118	
LZ		9		9	
Key way dimensions	LW	45		55	
	LK	41		51	
	KW	8h9		8h9	
	KH	7		7	
	RH	18		20	
Mass (kg)	Without brake	10.6	10.6	14.6	14.6
	With brake	12.5	12.5	16.5	16.5
Connector/Plug specifications		Refer to P.180, "Options".			

<Cautions>
Reduce the moment of inertia ratio if high speed response operation is required.

• MDMA 4.0kW to 5.0kW



* Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

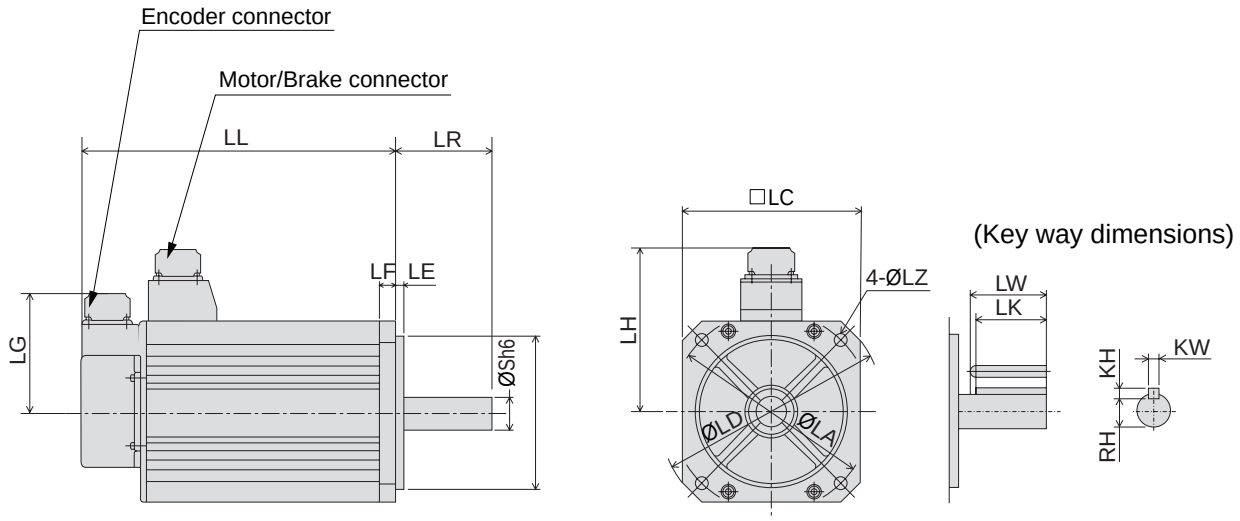
		MDMA series (Middle inertia)			
Motor output		4.0kW		5.0kW	
Motor model	MDMA	40 * P1 *	40 * S1 *	50 * P1 *	50 * S1 *
Rotary encoder specifications		2500P/r Incremental	17-bit Absolute/Incremental	2500P/r Incremental	17-bit Absolute/Incremental
LL	Without brake	242	242	225	225
	With brake	267	267	250	250
LR		65		70	
S		28		35	
LA		165		200	
LB		130		114.3	
LC		150		176	
LD		190		233	
LE		3.2		3.2	
LF		18		18	
LG		84		84	
LH		128		143	
LZ		11		13.5	
Key way dimensions	LW	55		55	
	LK	51		50	
	KW	8h9		10h9	
	KH	7		8	
	RH	24		30	
Mass (kg)	Without brake	18.8	18.8	25.0	25.0
	With brake	21.3	21.3	28.5	28.5
Connector/Plug specifications		Refer to P.180, "Options".			

<Cautions>
Reduce the moment of inertia ratio if high speed response operation is required.

Dimensions (Motor)

• MGMA 900W to 2.0kW

MGMA 900W to 2.0kW



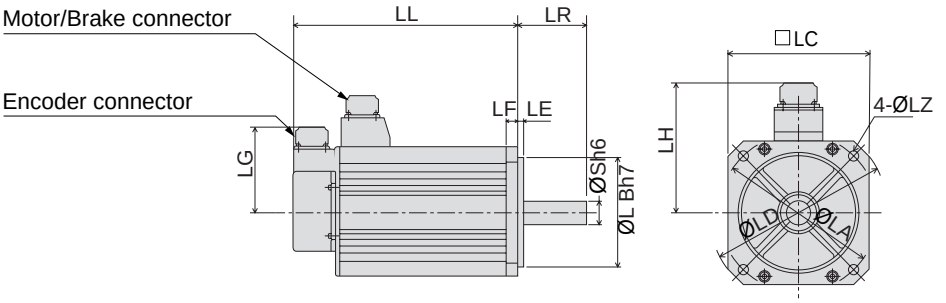
* Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

		MGMA series (Middle inertia)			
Motor output		900W		2.0kW	
Motor model	MGMA	09 * P1 *	09 * S1 *	20 * P1 *	20 * S1 *
Rotary encoder specifications		2500P/r Incremental	17-bit Absolute/Incremental	2500P/r Incremental	17-bit Absolute/Incremental
LL	Without brake	175	175	182	182
	With brake	200	200	207	207
LR		70		80	
S		22		35	
LA		145		200	
LB		110		114.3	
LC		130		176	
LD		165		233	
LE		6		3.2	
LF		12		18	
LG		84		84	
LH		118		143	
LZ		9		13.5	
Key way dimensions	LW	45		55	
	LK	41		50	
	KW	8h9		10h9	
	KH	7		8	
	RH	18		30	
Mass (kg)	Without brake	8.5	8.5	17.5	17.5
	With brake	10.0	10.0	21.0	21.0
Connector/Plug specifications		Refer to P.180, "Options".			

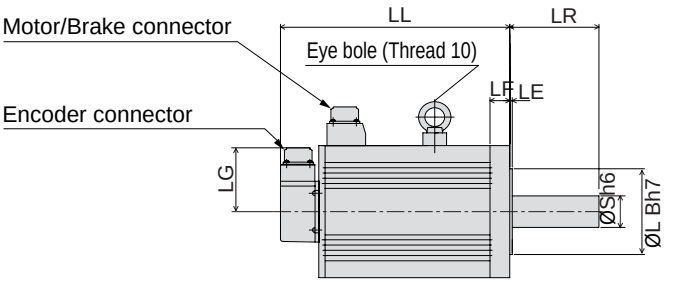
<Cautions>
Reduce the moment of inertia ratio if high speed response operation is required.

•MGMA 3.0kW to 4.5kW

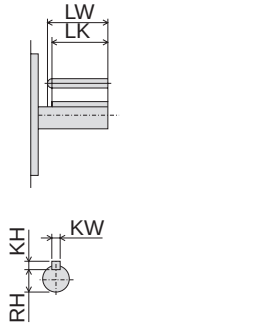
MGMA 3.0kW



MGMA 4.5kW



(Key way dimensions)



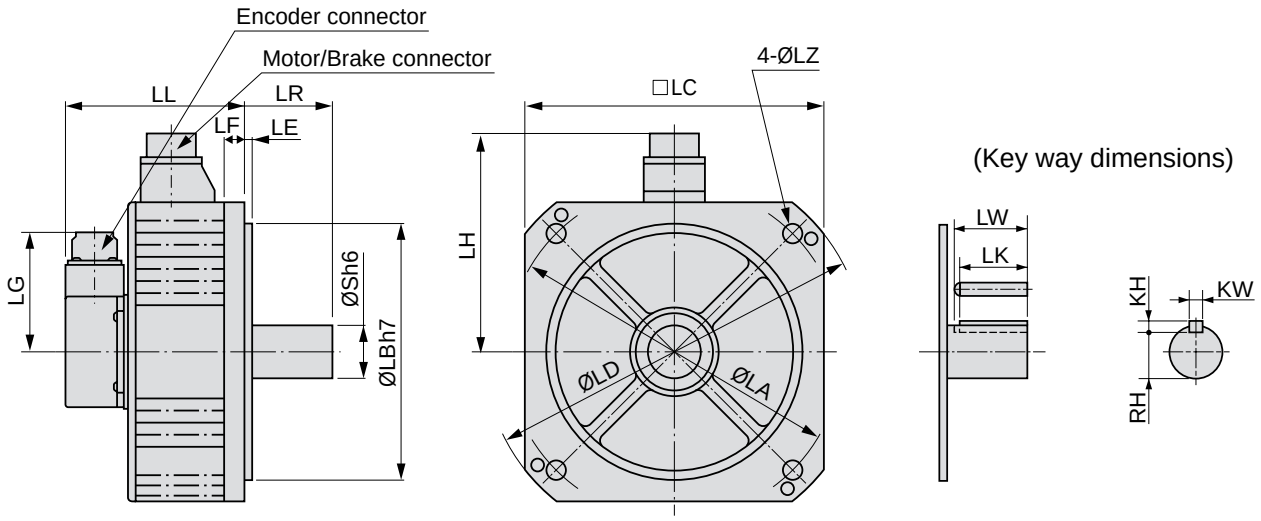
* Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

		MGMA series (Middle inertia)			
Motor output		3.0kW		4.5kW	
Motor model	MGMA	30 * P1 *	30 * S1 *	45 * P1 *	45 * S1 *
Rotary encoder specifications		2500P/r Incremental	17-bit Absolute/Incremental	2500P/r Incremental	17-bit Absolute/Incremental
L L	Without brake	222	222	300.5	300.5
	With brake	271	271	337.5	337.5
L R		80		113	
S		35		42	
L A		200		200	
L B		114.3		114.3	
L C		176		176	
L D		233		233	
L E		3.2		3.2	
L F		18		24	
L G		84		84	
L H		143		143	
L Z		13.5		13.5	
Key way dimensions	L W	55		96	
	L K	50		90	
	K W	10h9		12h9	
	K H	8		8	
	R H	30		37	
Mass (kg)	Without brake	25.0	25.0	34.0	34.0
	With brake	28.5	28.5	39.5	39.5
Connector/Plug specifications		Refer to P.180, "Options".			

<Cautions>
Reduce the moment of inertia ratio if high speed response operation is required.

Dimensions (Motor)

• MFMA 400W to 1.5kW

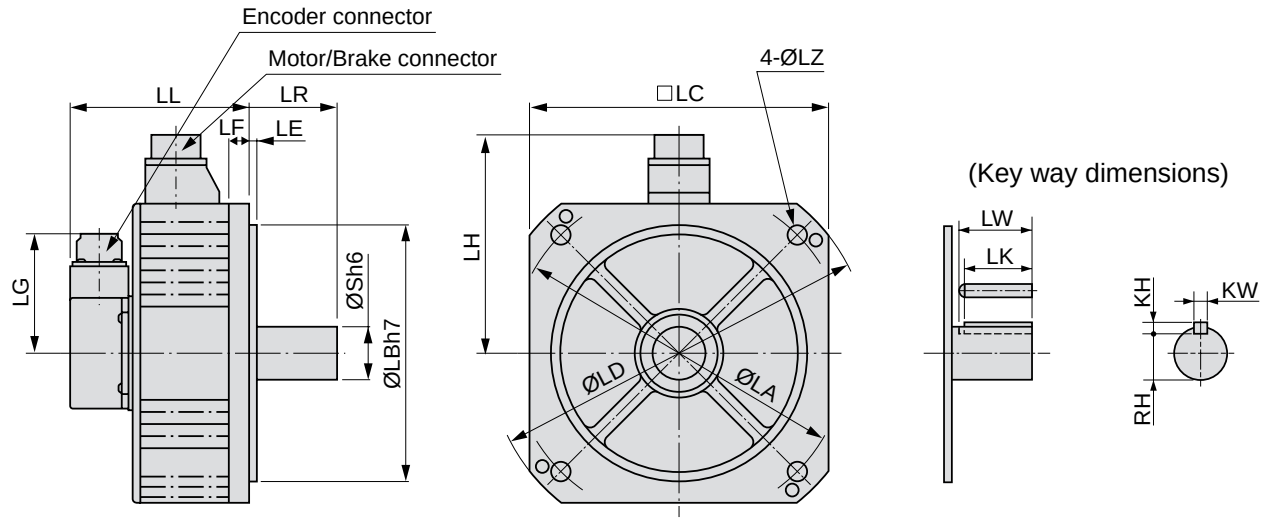


* Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

		MFMA series (Middle inertia)			
Motor output		400W		1.5kW	
Motor model	MFMA	04 * P1 *	04 * S1 *	15 * P1 *	15 * S1 *
Rotary encoder specifications		2500P/r Incremental	17-bit Absolute/Incremental	2500P/r Incremental	17-bit Absolute/Incremental
LL	Without brake	120	120	145	145
	With brake	145	145	170	170
LR		55		65	
S		19		35	
LA		145		200	
LB		110		114.3	
LC		130		176	
LD		165		233	
LE		6		3.2	
LF		12		18	
LG		84		84	
LH		118		143	
LZ		9		13.5	
Key way dimensions	LW	45		55	
	LK	42		50	
	KW	6h9		10h9	
	KH	6		8	
	RH	15.5		30	
Mass (kg)	Without brake	4.7	4.7	11.0	11.0
	With brake	6.7	6.7	14.0	14.0
Connector/Plug specifications		Refer to P.180, "Options".			

<Cautions>
Reduce the moment of inertia ratio if high speed response operation is required.

• MFMA 2.5kW to 4.5kW



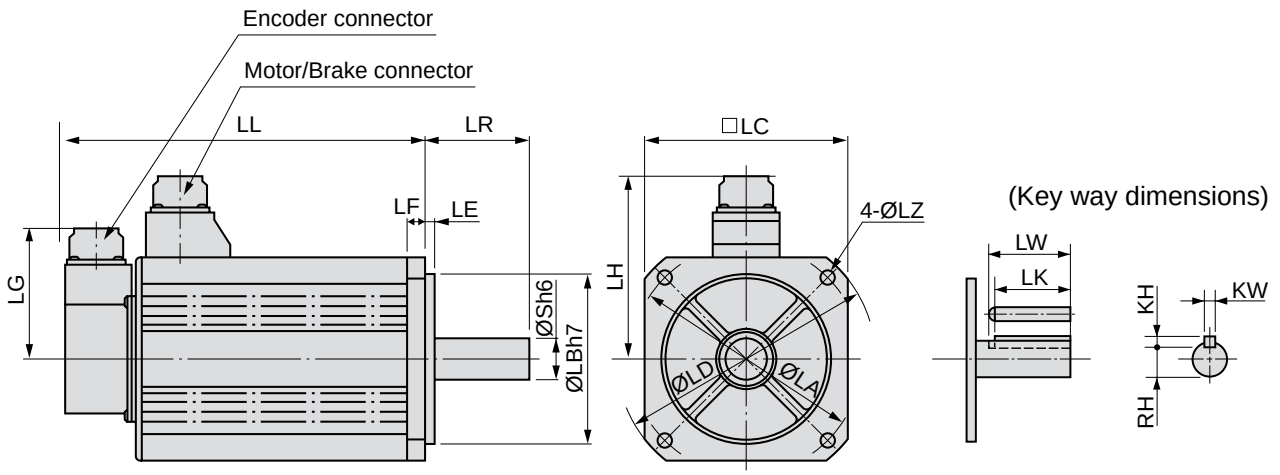
* Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

		MFMA series (Middle inertia)			
Motor output		2.5kW		4.5kW	
Motor model	MFMA	25 * P1 *	25 * S1 *	45 * P1 *	45 * S1 *
Rotary encoder specifications		2500P/r Incremental	17-bit Absolute/Incremental	2500P/r Incremental	17-bit Absolute/Incremental
LL	Without brake	139	139	163	163
	With brake	166	166	194	194
LR		65		70	
S		35		35	
LA		235		235	
LB		200		200	
LC		220		220	
LD		268		268	
LE		4		4	
LF		16		16	
LG		84		84	
LH		164		164	
LZ		13.5		13.5	
Key way dimensions	LW	55		55	
	LK	50		50	
	KW	10h9		10h9	
	KH	8		8	
	RH	30		30	
Mass (kg)	Without brake	14.8	14.8	19.9	19.9
	With brake	17.5	17.5	24.3	24.3
Connector/Plug specifications		Refer to P.180, "Options".			

<Cautions>
Reduce the moment of inertia ratio if high speed response operation is required.

Dimensions (Motor)

• MHMA 500W to 1.5kW

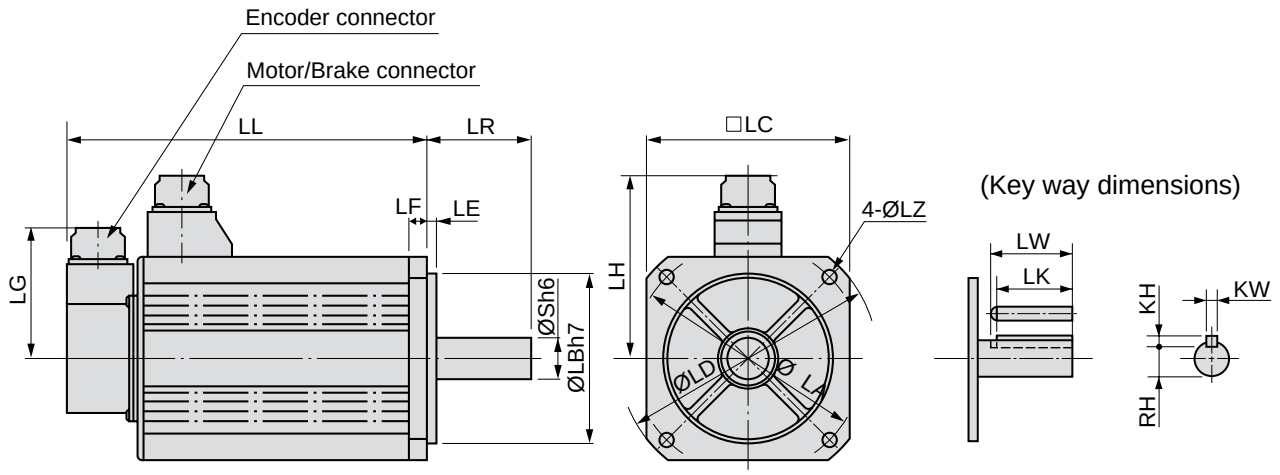


* Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

		MHMA series (High inertia)					
Motor output		500W		1.0kW		1.5kW	
Motor model	MHMA	05 * P1 *	05 * S1 *	10 * P1 *	10 * S1 *	15 * P1 *	15 * S1 *
Rotary encoder specifications		2500P/r Incremental	17-bit Absolute/ Incremental	2500P/r Incremental	17-bit Absolute/ Incremental	2500P/r Incremental	17-bit Absolute/ Incremental
LL	Without brake	150	150	175	175	200	200
	With brake	175	175	200	200	225	225
LR		70		70		70	
S		22		22		22	
LA		145		145		145	
LB		110		110		110	
LC		130		130		130	
LD		165		165		165	
LE		6		6		6	
LF		12		12		12	
LG		84		84		84	
LH		118		118		118	
LZ		9		9		9	
Key way dimensions	LW	45		45		45	
	LK	41		41		41	
	KW	8h9		8h9		8h9	
	KH	7		7		7	
	RH	18		18		18	
Mass (kg)	Without brake	5.3	5.3	8.9	8.9	10.0	10.0
	With brake	6.9	6.9	9.5	9.5	11.6	11.6
Connector/Plug specifications		Refer to P.180, "Options".					

<Cautions>
Reduce the moment of inertia ratio if high speed response operation is required.

• MHMA 2.0kW to 5.0kW



* Dimensions are subject to change without notice. Contact us or a dealer for the latest information.

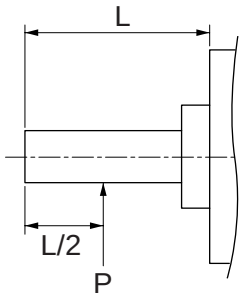
		MHMA series (High inertia)							
Motor output		2.0kW		3.0kW		4.0kW		5.0kW	
Motor model	MHMA	20 * P1 *	20 * S1 *	30 * P1 *	30 * S1 *	40 * P1 *	40 * S1 *	50 * P1 *	50 * S1 *
Rotary encoder specifications		2500P/r Incremental	17-bit Absolute/ Incremental	2500P/r Incremental	17-bit Absolute/ Incremental	2500P/r Incremental	17-bit Absolute/ Incremental	2500P/r Incremental	17-bit Absolute/ Incremental
LL	Without brake	190	190	205	205	230	230	255	255
	With brake	215	215	230	230	255	255	280	280
LR		80		80		80		80	
S		35		35		35		35	
LA		200		200		200		200	
LB		114.3		114.3		114.3		114.3	
LC		176		176		176		176	
LD		233		233		233		233	
LE		3.2		3.2		3.2		3.2	
LF		18		18		18		18	
LG		84		84		84		84	
LH		143		143		143		143	
LZ		13.5		13.5		13.5		13.5	
Key way dimensions	LW	55		55		55		55	
	LK	50		50		50		50	
	KW	10h9		10h9		10h9		10h9	
	KH	8		8		8		8	
	RH	30		30		30		30	
Mass (kg)	Without brake	16.0	16.0	18.2	18.2	22.0	22.0	26.7	26.7
	With brake	19.5	19.5	21.7	21.7	25.5	25.5	30.2	30.2
Connector/Plug specifications		Refer to P.180, "Options".							

<Cautions>

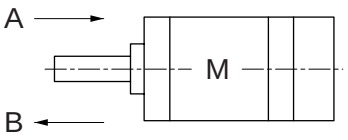
Reduce the moment of inertia ratio if high speed response operation is required.

Permissible Load at Output Shaft

Radial load (P) direction



Thrust load (A and B) direction

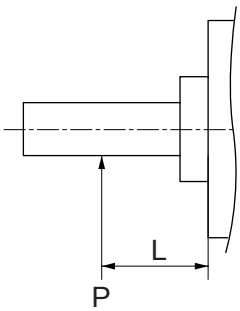


Unit : N (1kgf= 9.8N)

Motor series	Motor output	At assembly			During running	
		Radial thrust	Thrust load		Radial thrust	Thrust load A and B-direction
			A-direction	B-direction		
MSMD	50W, 100W	147	88	117.6	68.6	58.8
	200W, 400W	392	147	196	245	98
	750W	686	294	392	392	147
MSMA	1kW	686	392	490	392	147
	1.5kW to 3.0kW	980	588	686	490	196
	4.0kW to 5.0kW				784	343
MQMA	100W	147	88	117.6	68.6	58.8
	200W, 400W	392	147	196	245	98
MDMA	1.0kW to 2.0kW	980	588	686	490	196
	3.0kW				784	343
	4.0kW	1666	784	980		
	5.0kW					
MHMA	500W to 1.5kW	980	588	686	490	196
	2.0kW to 5.0kW	1666	784	980	784	343
MFMA	400W	980	588	686	392	147
	1.5kW				490	196
	2.5kW, 4.5kW	1862	686		784	294
MGMA	900W	980	588		686	196
	2.0kW	1666	784	980	1176	490
	3.0kW, 4.5kW	2058	980	1176	1470	

<Note>

When the load point varies, calculate the permissible radial load, P (N) from the distance of the load point, L (mm) from the mounting flange based on the formula of the right table, and make it smaller than the calculated result.



Motor series	Motor output	Formula of Load and load point relation
MSMD	50W	$P = \frac{3533}{L+39}$
	100W	$P = \frac{4905}{L+59}$
	200W	$P = \frac{14945}{L+46}$
	400W	$P = \frac{19723}{L+65.5}$
	750W	$P = \frac{37044}{L+77}$

Motor Characteristics (S-T Characteristics) [Supplement]

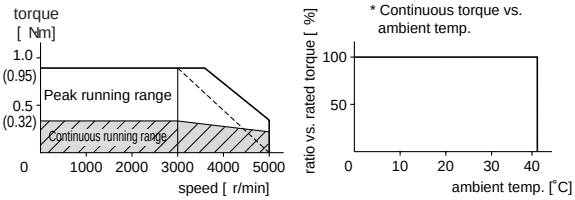
- Note that the motor characteristics may vary due to the existence of oil seal or brake.
- Continuous torque vs. ambient temperature characteristics have been measured with an aluminum flange attached to the motor (approx. twice as large as the motor flange).

MQMA series (100W to 400W)

With and without oil seal

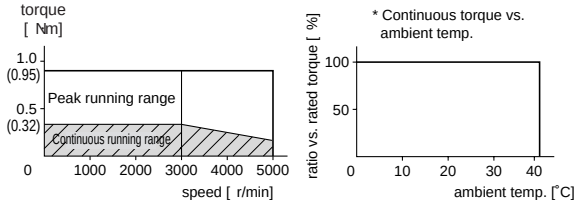
• MQMA011 * 1 *

Input voltage to driver: AC100V (Dotted line represents torque at 10% less voltage.)



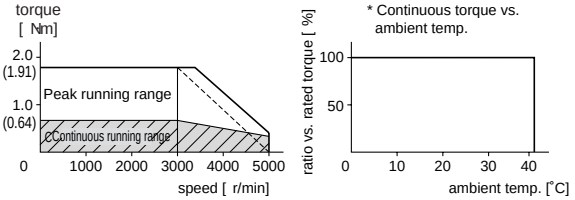
• MQMA012 * 1 *

Input voltage to driver: AC200V (Dotted line represents torque at 10% less voltage.)



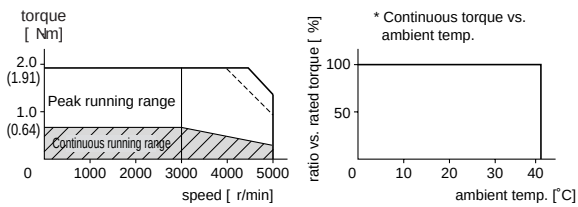
• MQMA021 * 1 *

Input voltage to driver: AC100V (Dotted line represents torque at 10% less voltage.)



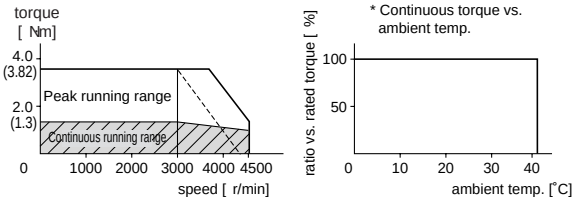
• MQMA022 * 1 *

Input voltage to driver: AC200V (Dotted line represents torque at 10% less voltage.)



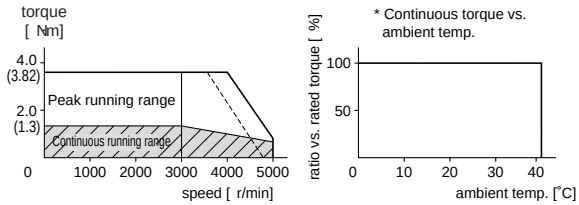
• MQMA041 * 1 *

Input voltage to driver: AC100V (Dotted line represents torque at 10% less voltage.)



• MQMA042 * 1 *

Input voltage to driver: AC200V (Dotted line represents torque at 10% less voltage.)

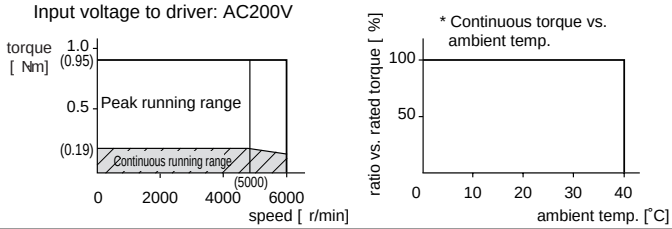


MAMA series (100W to 750W)

without oil seal

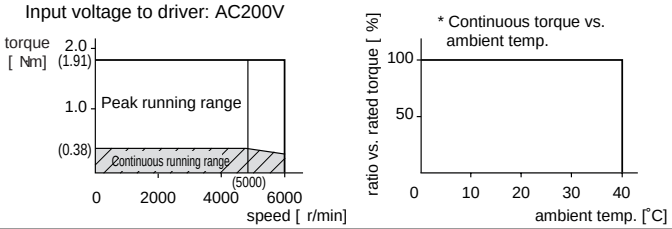
• MAMA012 * 1 *

Input voltage to driver: AC200V



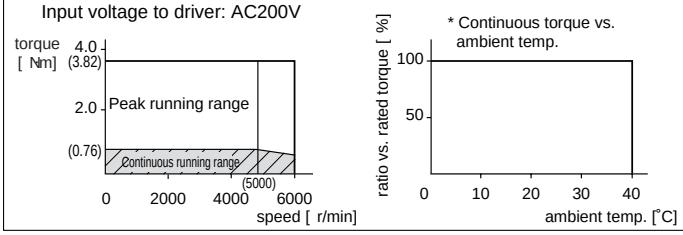
• MAMA022 * 1 *

Input voltage to driver: AC200V



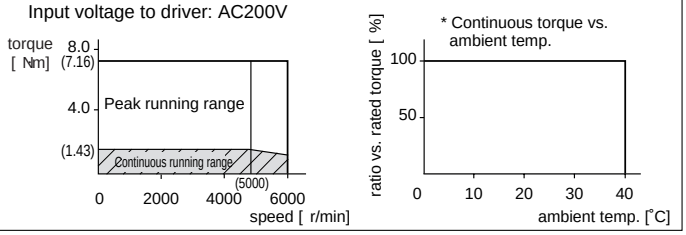
• MAMA042 * 1 *

Input voltage to driver: AC200V



• MAMA082 * 1 *

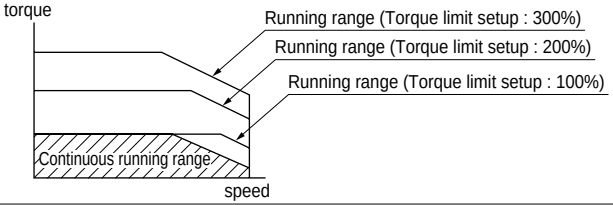
Input voltage to driver: AC200V



* These are subject to change. Contact us when you use these values for your machine design.

* Ratio to the rated torque at ambient temperature of 40˚C is 100% in case of without oil seal, without brake.

- When you lower the torque limit setup (Pr5E and 5F), running range at high speed might be lowered as well.


torque
Running range (Torque limit setup : 300%)
Running range (Torque limit setup : 200%)
Running range (Torque limit setup : 100%)
Continuous running range
speed

Supplement

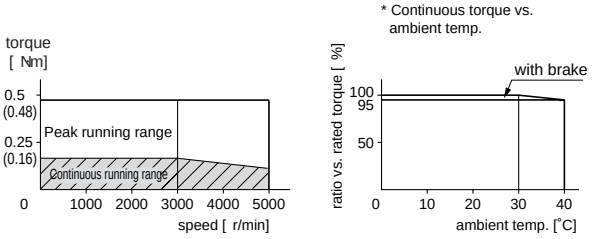
Motor Characteristics (S-T Characteristics)

MSMD series (50W to 100W)

without oil seal

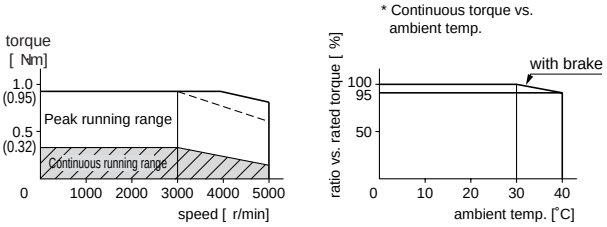
• MSMD5AZ * 1 *

Input voltage to driver: AC100V/200V
(Dotted line represents torque at 10% less voltage.)



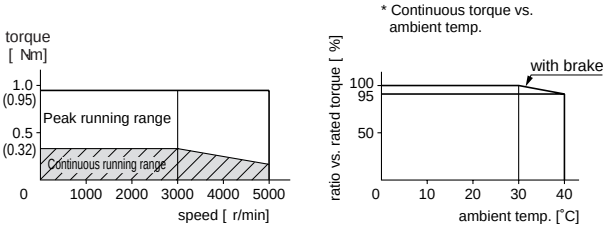
• MSMD011 * 1 *

Input voltage to driver: AC100V
(Dotted line represents torque at 10% less voltage.)



• MSMD012 * 1 *

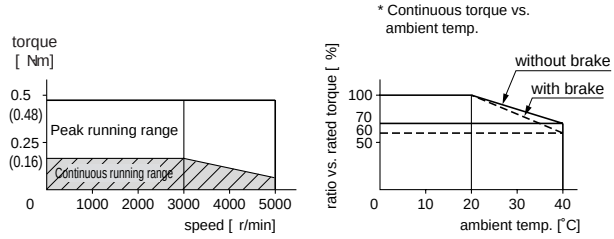
Input voltage to driver: AC200V



with oil seal

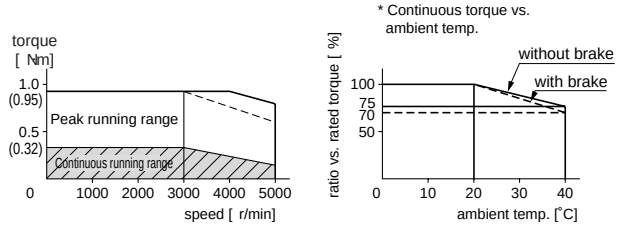
• MSMD5AZ * 1 *

Input voltage to driver: AC100V/200V
(Dotted line represents torque at 10% less voltage.)



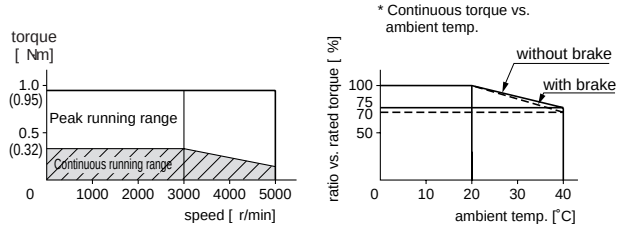
• MSMD011 * 1 *

Input voltage to driver: AC100V
(Dotted line represents torque at 10% less voltage.)



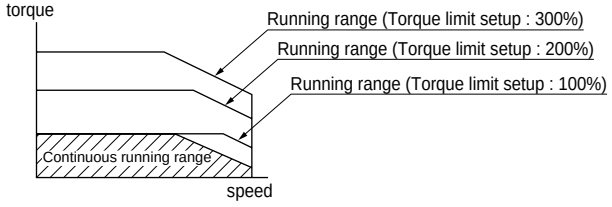
• MSMD012 * 1 *

Input voltage to driver: AC200V



* These are subject to change. Contact us when you use these values for your machine design.
* Ratio to the rated torque at ambient temperature of 40˚C is 100% in case of without oil seal, without brake.

• When you lower the torque limit setup (Pr5E and 5F), running range at high speed might be lowered as well.

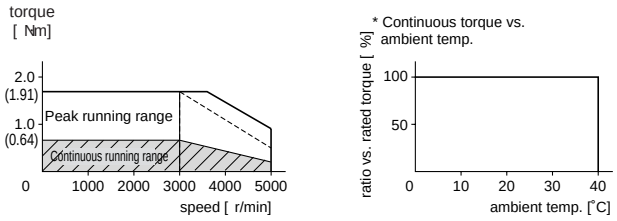

torque
Running range (Torque limit setup : 300%)
Running range (Torque limit setup : 200%)
Running range (Torque limit setup : 100%)
Continuous running range
speed

MSMD series (200W to 750W)

without oil seal

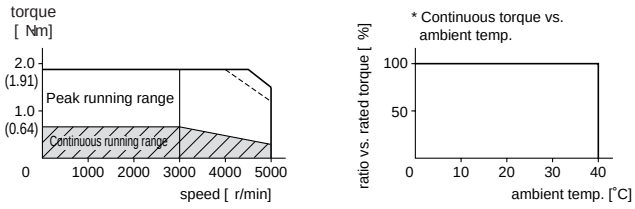
• MSMD021 * 1 *

Input voltage to driver: AC100V
(Dotted line represents torque at 10% less voltage.)



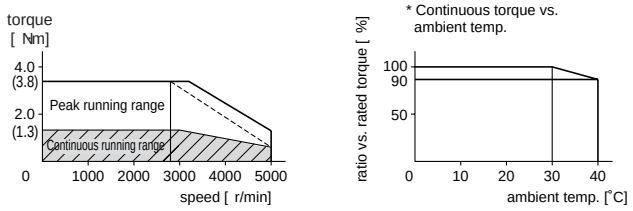
• MSMD022 * 1 *

Input voltage to driver: AC200V
(Dotted line represents torque at 10% less voltage.)



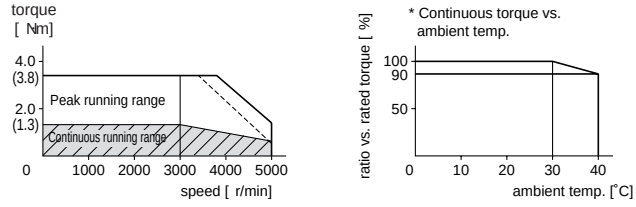
• MSMD041 * 1 *

Input voltage to driver: AC100V
(Dotted line represents torque at 10% less voltage.)



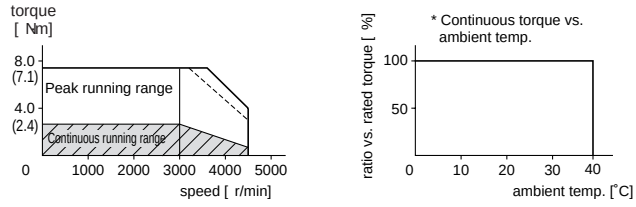
• MSMD042 * 1 *

Input voltage to driver: AC200V
(Dotted line represents torque at 10% less voltage.)



• MSMD082 * 1 *

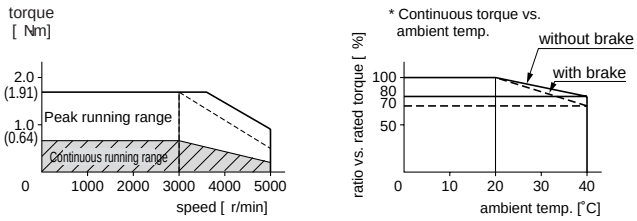
Input voltage to driver: AC200V
(Dotted line represents torque at 10% less voltage.)



With oil seal

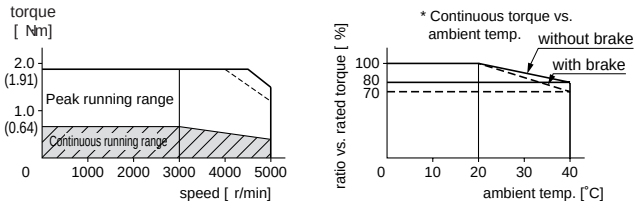
• MSMD021 * 1 *

Input voltage to driver: AC100V
(Dotted line represents torque at 10% less voltage.)



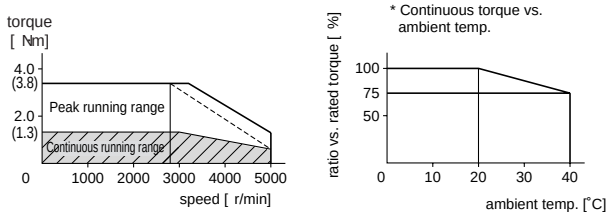
• MSMD022 * 1 *

Input voltage to driver: AC200V
(Dotted line represents torque at 10% less voltage.)



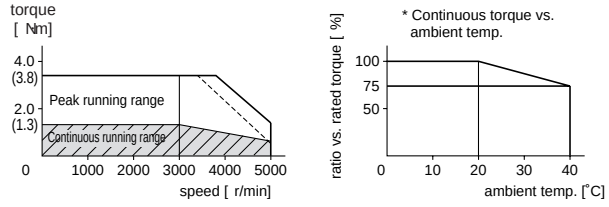
• MSMD041 * 1 *

Input voltage to driver: AC100V
(Dotted line represents torque at 10% less voltage.)



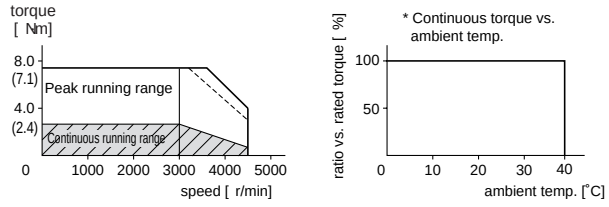
• MSMD042 * 1 *

Input voltage to driver: AC200V
(Dotted line represents torque at 10% less voltage.)



• MSMD082 * 1 *

Input voltage to driver: AC200V
(Dotted line represents torque at 10% less voltage.)



* These are subject to change. Contact us when you use these values for your machine design.

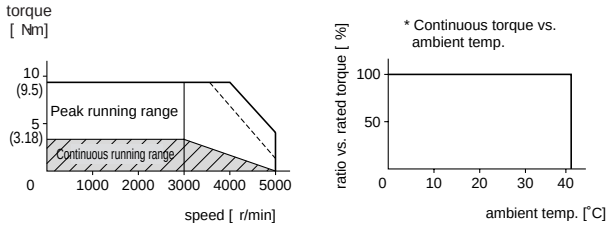
Motor Characteristics (S-T Characteristics)

MSMA series (1.0kW to 5.0kW)

With oil seal

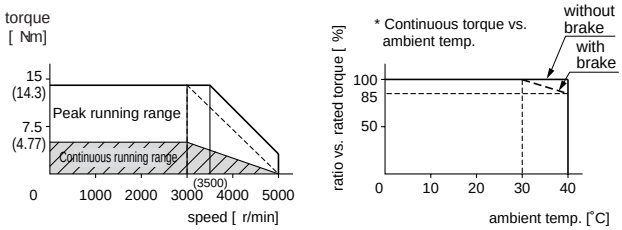
• MSMA102 * 1 *

Input voltage to driver: AC200V
(Dotted line represents torque at 10% less voltage.)



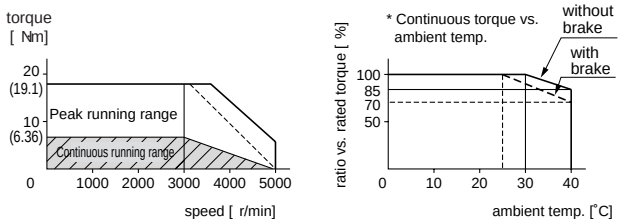
• MSMA152 * 1 *

Input voltage to driver: AC200V
(Dotted line represents torque at 10% less voltage.)



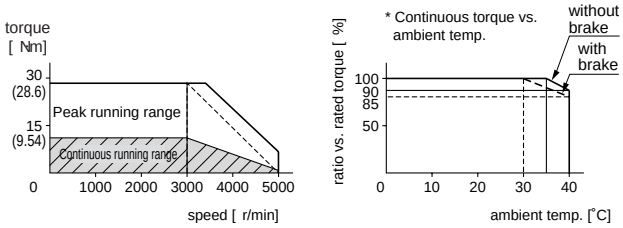
• MSMA202 * 1 *

Input voltage to driver: AC200V
(Dotted line represents torque at 10% less voltage.)



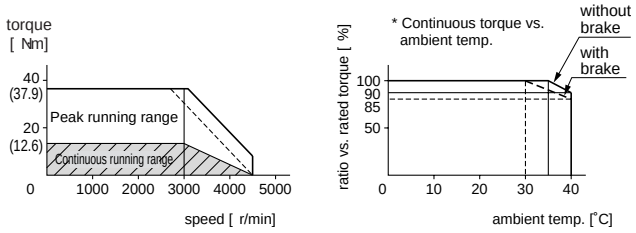
• MSMA302 * 1 *

Input voltage to driver: AC200V
(Dotted line represents torque at 10% less voltage.)



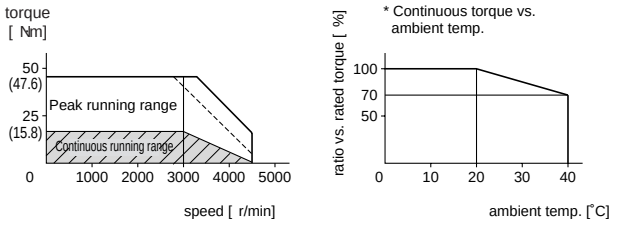
• MSMA402 * 1 *

Input voltage to driver: AC200V
(Dotted line represents torque at 10% less voltage.)



• MSMA502 * 1 *

Input voltage to driver: AC200V
(Dotted line represents torque at 10% less voltage.)

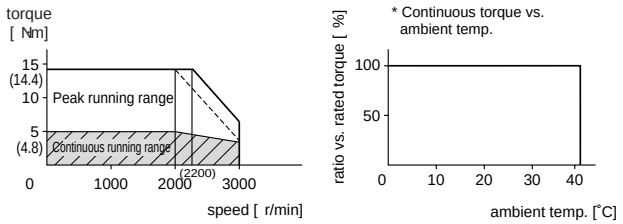


MDMA series (1.0kW to 2.0kW)

With oil seal

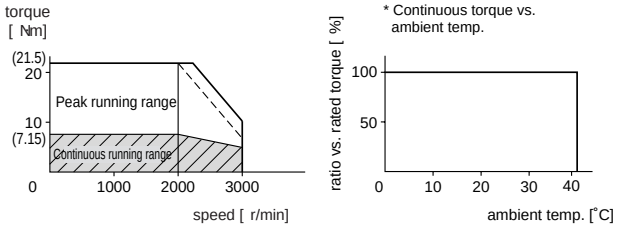
• MDMA102 * 1 *

Input voltage to driver: AC200V
(Dotted line represents torque at 10% less voltage.)



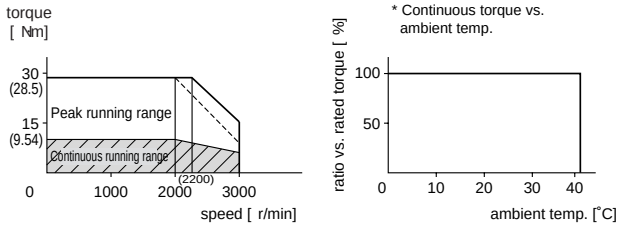
• MDMA152 * 1 *

Input voltage to driver: AC200V
(Dotted line represents torque at 10% less voltage.)



• MDMA202 * 1 *

Input voltage to driver: AC200V
(Dotted line represents torque at 10% less voltage.)



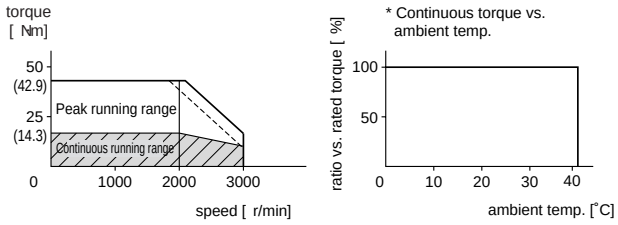
* These are subject to change. Contact us when you use these values for your machine design.

MDMA series (3.0kW to 5.0kW)

With oil seal

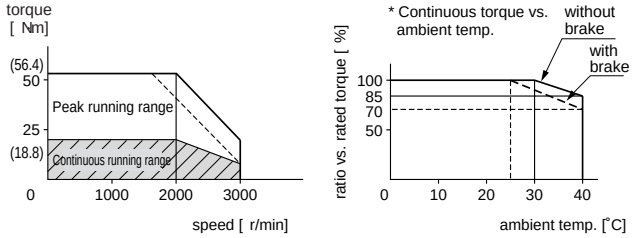
• MDMA302 * 1 *

Input voltage to driver: AC200V
(Dotted line represents torque at 10% less voltage.)



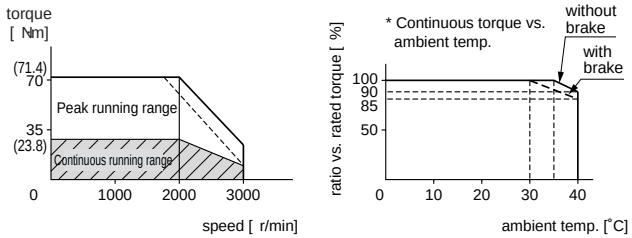
• MDMA402 * 1 *

Input voltage to driver: AC200V
(Dotted line represents torque at 10% less voltage.)



• MDMA502 * 1 *

Input voltage to driver: AC200V
(Dotted line represents torque at 10% less voltage.)

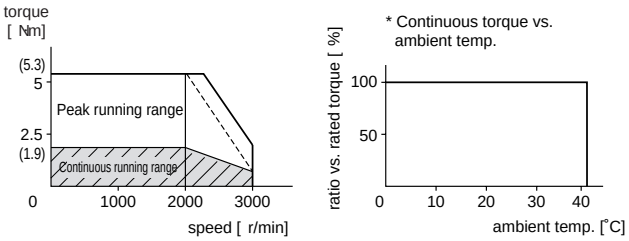


MFMA series (400W to 4.5kW)

With oil seal

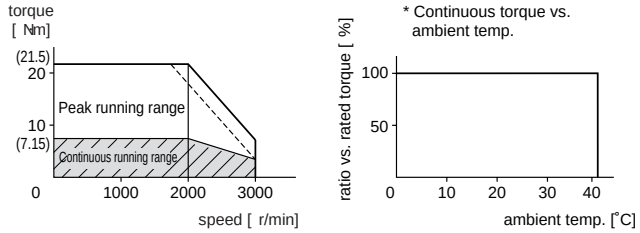
• MFMA042 * 1 *

Input voltage to driver: AC200V
(Dotted line represents torque at 10% less voltage.)



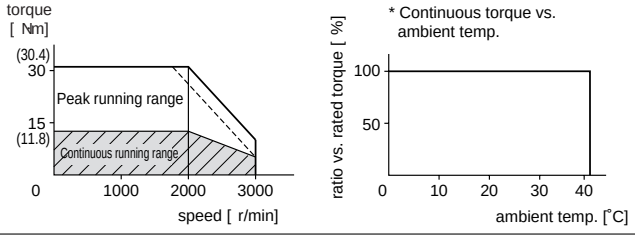
• MFMA152 * 1 *

Input voltage to driver: AC200V
(Dotted line represents torque at 10% less voltage.)



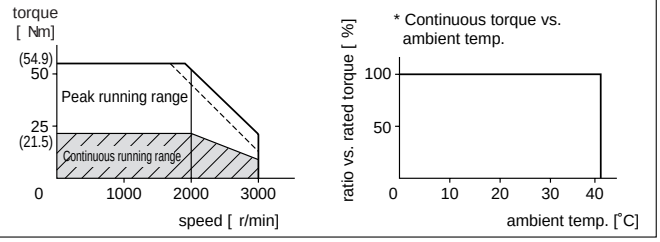
• MFMA252 * 1 *

Input voltage to driver: AC200V
(Dotted line represents torque at 10% less voltage.)



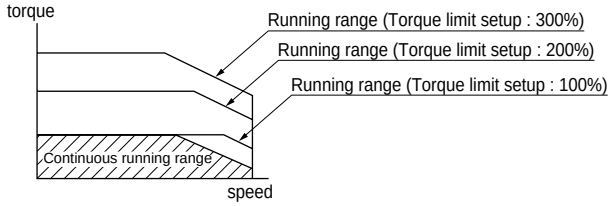
• MFMA452 * 1 *

Input voltage to driver: AC200V
(Dotted line represents torque at 10% less voltage.)



* These are subject to change. Contact us when you use these values for your machine design.

• When you lower the torque limit setup (Pr5E and 5F), running range at high speed might be lowered as well.


torque
Running range (Torque limit setup : 300%)
Running range (Torque limit setup : 200%)
Running range (Torque limit setup : 100%)
Continuous running range
speed

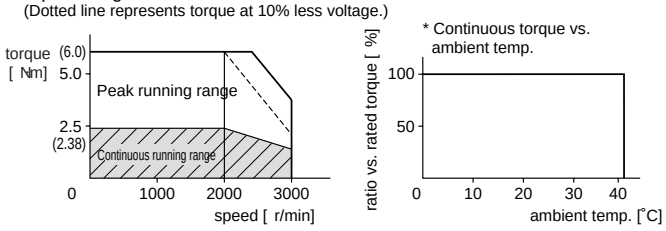
Motor Characteristics (S-T Characteristics)

MHMA series (500W to 5.0kW)

With oil seal

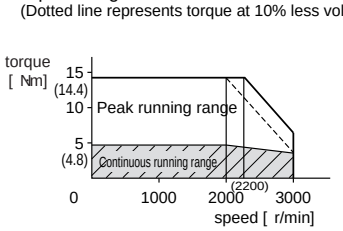
• MHMA052 * 1 *

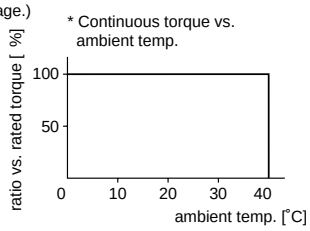
Input voltage to driver: AC200V
(Dotted line represents torque at 10% less voltage.)



• MHMA102 * 1 *

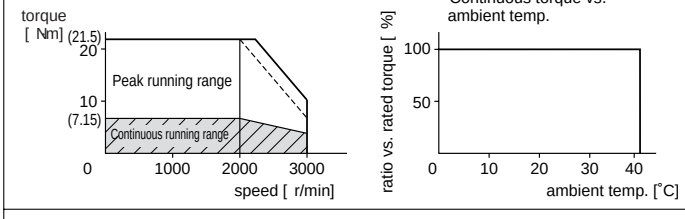
Input voltage to driver: AC200V
(Dotted line represents torque at 10% less voltage.)





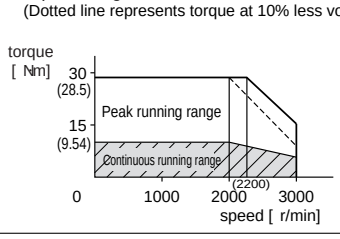
• MHMA152 * 1 *

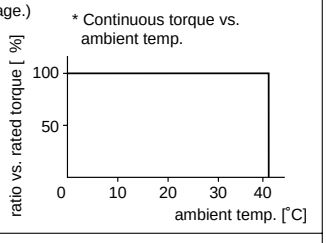
Input voltage to driver: AC200V
(Dotted line represents torque at 10% less voltage.)



• MHMA202 * 1 *

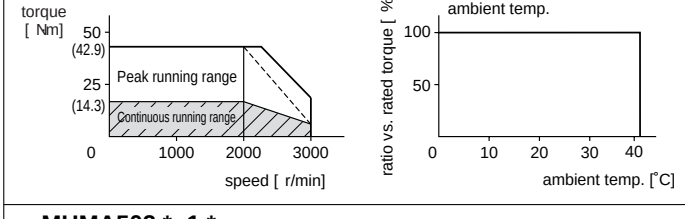
Input voltage to driver: AC200V
(Dotted line represents torque at 10% less voltage.)





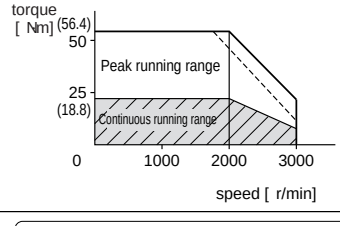
• MHMA302 * 1 *

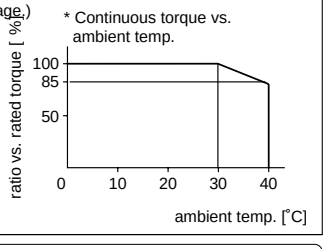
Input voltage to driver: AC200V
(Dotted line represents torque at 10% less voltage.)



• MHMA402 * 1 *

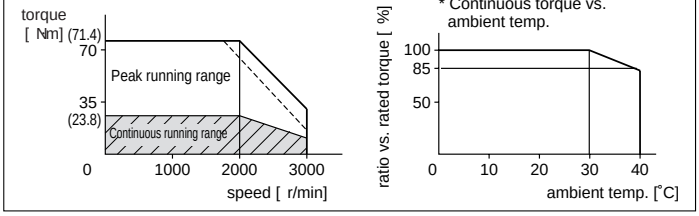
Input voltage to driver: AC200V
(Dotted line represents torque at 10% less voltage.)



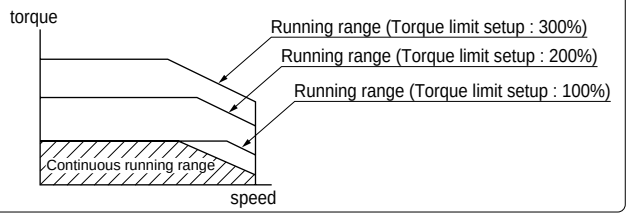


• MHMA502 * 1 *

Input voltage to driver: AC200V
(Dotted line represents torque at 10% less voltage.)



• When you lower the torque limit setup (Pr5E and 5F), running range at high speed might be lowered as well.

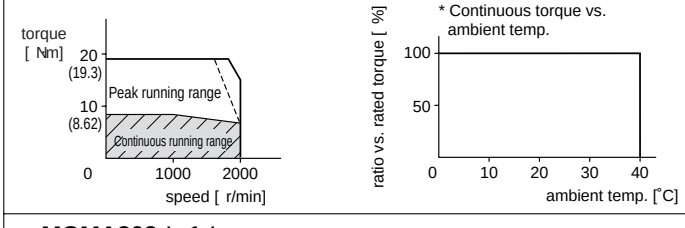

torque
Running range (Torque limit setup : 300%)
Running range (Torque limit setup : 200%)
Running range (Torque limit setup : 100%)
Continuous running range
speed

MGMA series (900W to 4.5kW)

With oil seal

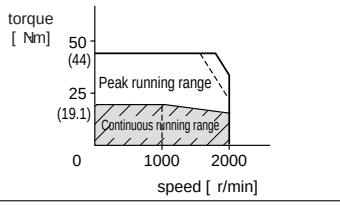
• MGMA092 * 1 *

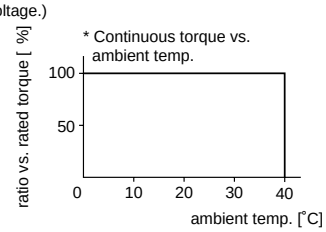
Input voltage to driver: AC200V
(Dotted line represents torque at 10% less voltage.)



• MGMA202 * 1 *

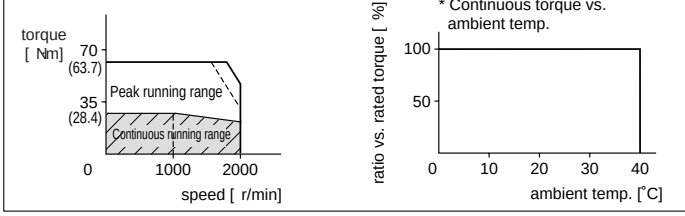
Input voltage to driver: AC200V
(Dotted line represents torque at 10% less voltage.)





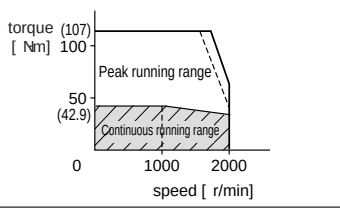
• MGMA302 * 1 *

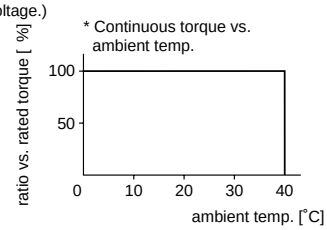
Input voltage to driver: AC200V
(Dotted line represents torque at 10% less voltage.)



• MGMA452 * 1 *

Input voltage to driver: AC200V
(Dotted line represents torque at 10% less voltage.)





* These are subject to change. Contact us when you use these values for your machine design.

Model No. of Motor with Gear Reduce

Model Designation

M S M D 0 1 1 P 3 1 N
1~4 5~6 7 8 9 10

Symbol	Type
MSMD	Low inertia

Motor rated output

Symbol	Output
01	100W
02	200W
04	400W
08	750W

Voltage specifications

Symbol	Specifications
1	100V
2	200V

Reduction ratio

Symbol	Reduction ratio
1N	1/5
2N	1/9
3N	1/15
4N	1/25

Rotary encoder specifications

Symbol	Specifications			
	Format	Pulse count	Resolution	Wire count
P	Incremental	2500P/r	10,000	5-wire
S	Absolute/Incremental common	17bit	131,072	7-wire

Motor structure

Symbol	Holding brake		Shaft
	Without	With	Key way
3	●		●
4		●	●

Combination of Driver and Motor with Gear Reducer

This driver is designed to be used in the combination with the specified motor model.
Check the series name, rated output and voltage specifications and the encoder specifications of the applicable motor.

Incremental Specifications, 2500P/r

<Remark>

Do not use the driver and the motor with gear reducer in other combinations than the one in the following table.

• Incremental specifications, 2500P/r

	Applicable motor with gear reducer					Applicable driver	
Power supply	Rated output of motor	Reduction ratio of 1/5	Reduction ratio of 1/9	Reduction ratio of 1/15	Reduction ratio of 1/25	Model No. of driver	Frame of driver
Single phase, 100V	100W	MSMD011P * 1N	MSMD011P * 2N	MSMD011P * 3N	MSMD011P * 4N	MADDT1107P	A-frame
	200W	MSMD021P * 1N	MSMD021P * 2N	MSMD021P * 3N	MSMD021P * 3N	MBDDT2110P	B-frame
	400W	MSMD041P * 1N	MSMD041P * 2N	MSMD041P * 3N	MSMD041P * 4N	MCDDT3120P	C-frame
Single phase, 200V	100W	MSMD012P * 1N	MSMD012P * 2N	MSMD012P * 3N	MSMD012P * 4N	MADDT1205P	A-frame
	200W	MSMD022P * 1N	MSMD022P * 2N	MSMD022P * 3N	MSMD022P * 3N	MADDT1207P	
	400W	MSMD042P * 1N	MSMD042P * 2N	MSMD042P * 3N	MSMD042P * 4N	MBDDT2210P	B-frame
	750W	MSMD082P * 1N	MSMD082P * 2N	MSMD082P * 3N	MSMD082P * 4N	MCDDT3520P	C-frame
3-phase, 200V	750W	MSMD082P * 1N	MSMD082P * 2N	MSMD082P * 3N	MSMD082P * 4N	MCDDT3520P	C-frame

• Absolute/Incremental specifications, 17bit

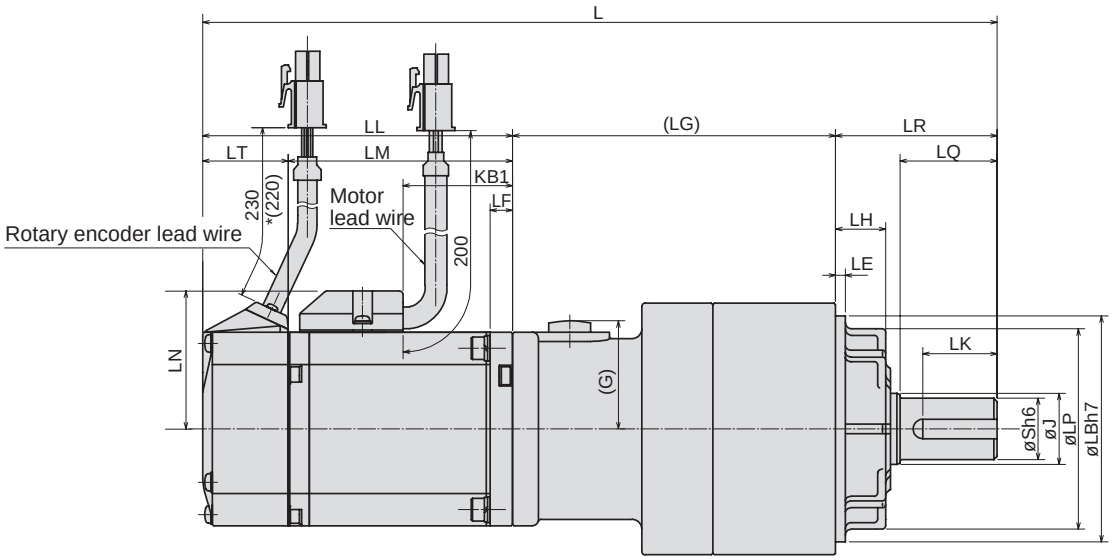
	Applicable motor with gear reducer					Applicable driver	
Power supply	Rated output of motor	Reduction ratio of 1/5	Reduction ratio of 1/9	Reduction ratio of 1/15	Reduction ratio of 1/25	Model No. of driver	Frame of driver
Single phase, 100V	100W	MSMD011S * 1N	MSMD011S * 2N	MSMD011S * 3N	MSMD011S * 4N	MADDT1107P	A-frame
	200W	MSMD021S * 1N	MSMD021S * 2N	MSMD021S * 3N	MSMD021S * 3N	MBDDT2110P	B-frame
	400W	MSMD041S * 1N	MSMD041S * 2N	MSMD041S * 3N	MSMD041S * 4N	MCDDT3120P	C-frame
Single phase, 200V	100W	MSMD012S * 1N	MSMD012S * 2N	MSMD012S * 3N	MSMD012S * 4N	MADDT1205P	A-frame
	200W	MSMD022S * 1N	MSMD022S * 2N	MSMD022S * 3N	MSMD022S * 3N	MADDT1207P	
	400W	MSMD042S * 1N	MSMD042S * 2N	MSMD042S * 3N	MSMD042S * 4N	MBDDT2210P	B-frame
	750W	MSMD082S * 1N	MSMD082S * 2N	MSMD082S * 3N	MSMD082S * 4N	MCDDT3520P	C-frame
3-phase, 200V	750W	MSMD082S * 1N	MSMD082S * 2N	MSMD082S * 3N	MSMD082S * 4N	MCDDT3520P	C-frame

<Note>

• "*" of the model No. represents the structure of the motor.

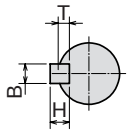
Dimensions/Motor with Gear Reducer

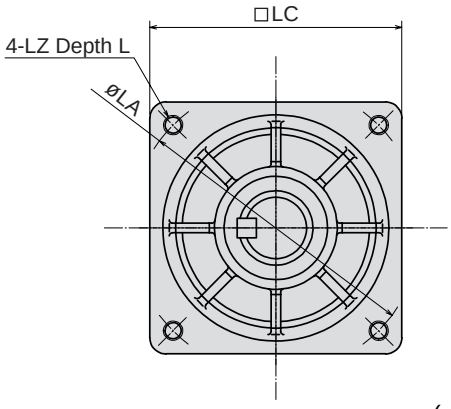
Motor with Gear Reducer



(unit : mm)

		Model	Motor output	Reduction rati0	L	LL	LM	LT	KB1	LF	LR	LQ	LB	S	LP	LH	J	(LG)	LE	(G)
MSMD	Without brake	MSMD01 * P31N	100W	1/5	191.5	92	68	24	40.8	6	32	20	50	12	45	10	14	67.5	3	25
		MSMD01 * P32N		1/9																
		MSMD01 * P33N		1/15	202													78		
		MSMD01 * P34N		1/25	234						50	30	70	19	62	17	22	92		
		MSMD02 * P31N	200W	1/5	183.5	79	56.5	22.5	22.5	6.5	32	20	50	12	45	10	14	72.5		34
		MSMD02 * P32N		1/9	218.5						50	30	70	19	62	17	22	89.5		
		MSMD02 * P33N		1/15	229													100		
		MSMD02 * P34N		1/25																
		MSMD04 * P31N	400W	1/5	238	98.5	76		42									89.5		
		MSMD04 * P32N		1/9																
		MSMD04 * P33N		1/15	248.5													100		
		MSMD04 * P34N		1/25	263.5						61	40	90	24	75	18	28	104	5	
		MSMD082P31N	750W	1/5	255.5	112	86.5	25.5	52.2	8	50	30	70	19	62	17	22	93.5	3	
		MSMD082P32N		1/9	270.5						61	40	90	24	75	18	28	97.5	5	
		MSMD082P33N		1/15	283													110		
		MSMD082P34N		1/25																
	With brake	MSMD01 * P41N	100W	1/5	221.5	122	98	24	40.8	6	32	20	50	12	45	10	14	67.5	3	25
		MSMD01 * P42N		1/9																
		MSMD01 * P43N		1/15	232													78		
		MSMD01 * P44N		1/25	264						50	30	70	19	62	17	22	92		
		MSMD02 * P41N	200W	1/5	220	115.5	93	22.5	22.5	6.5	32	20	50	12	45	10	14	72.5		34
		MSMD02 * P42N		1/9	255						50	30	70	19	62	17	22	89.5		
		MSMD02 * P43N		1/15	265.5													100		
		MSMD02 * P44N		1/25																
		MSMD04 * P41N	400W	1/5	274.5	135	112.5		42									89.5		
		MSMD04 * P42N		1/9																
		MSMD04 * P43N		1/15	285													100		
		MSMD04 * P44N		1/25	300						61	40	90	24	75	18	28	104	5	
		MSMD082P41N	750W	1/5	292.5	149	123.5	25.5	52.2	8	50	30	70	19	62	17	22	93.5	3	
		MSMD082P42N		1/9	307.5						61	40	90	24	75	18	28	97.5	5	
		MSMD082P43N		1/15	320													110		
		MSMD082P44N		1/25																





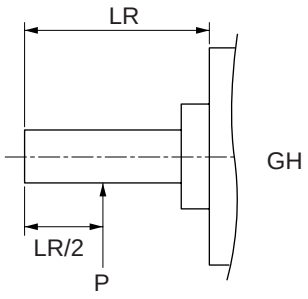
(unit : mm)

		LC	LA	LZ	LD	Kew way dimensions (B x H x LK)	T	LN	Mass (kg)	Moment of inertia (x 10^{-4}kg·m^2)
MSMD	Without brake	52	60	M5	12	4 x 4 x 16	2.5	32	1.02	0.0910
										0.0853
									1.17	0.0860
		78	90	M6	20	6 x 6 x 22	3.5		2.17	0.0885
		52	60	M5	12	4 x 4 x 16	2.5	43	1.54	0.258
		78	90	M6	20	6 x 6 x 22	3.5		2.52	0.408
										0.440
										0.428
									2.9	0.623
										0.528
									3.3	0.560
		98	115	M8		8 x 7 x 30	4		4.4	0.560
		78	90	M6		6 x 6 x 22	3.5	53		1.583
		98	115	M8		8 x 7 x 30	4		5.7	1.520
									6.1	1.570
										1.520
	With brake	52	60	M5	12	4 x 4 x 16	2.5	32	1.23	0.0940
										0.0883
									1.38	0.0890
		78	90	M6	20	6 x 6 x 22	3.5		2.38	0.0915
		52	60	M5	12	4 x 4 x 16	2.5	43	2.02	0.278
		78	90	M6	20	6 x 6 x 22	3.5		3.00	0.428
										0.460
										0.448
									3.4	0.643
										0.548
									3.8	0.580
		98	115	M8		8 x 7 x 30	4		4.9	0.580
		78	90	M6		6 x 6 x 22	3.5	53	5.2	1.683
		98	115	M8		8 x 7 x 30	4		6.5	1.620
									6.9	1.670
										1.620

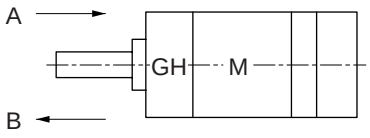
Moment of inertia is combined value of the motor and the gear reducer, and converted to that of the motor shaft .

Permissible Load at Output Shaft

Radial load (P) direction



Thrust load (A and B) direction



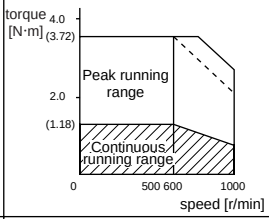
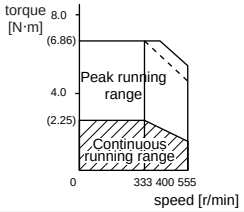
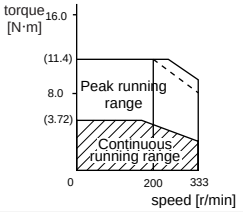
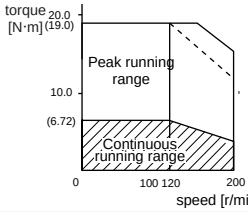
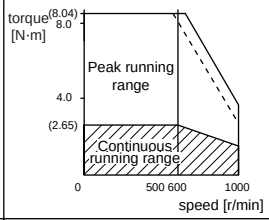
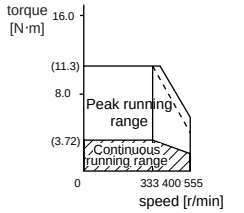
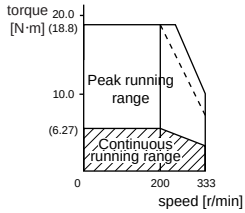
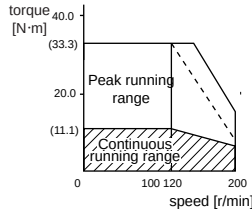
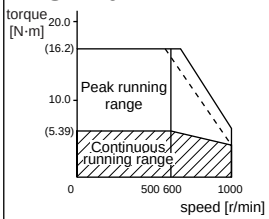
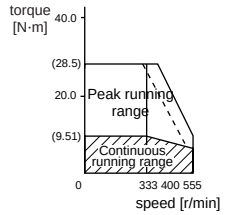
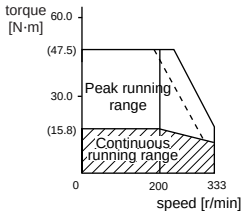
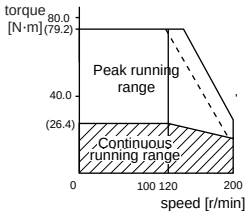
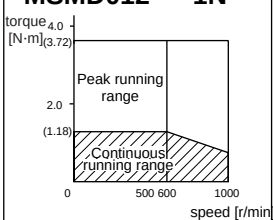
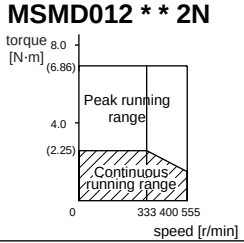
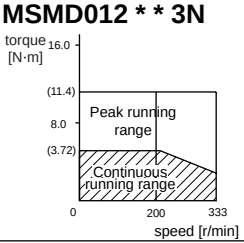
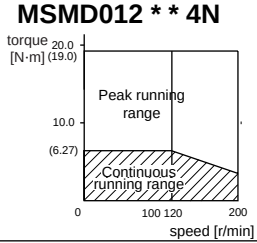
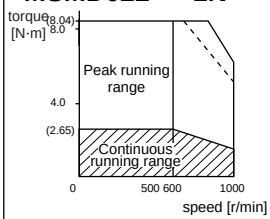
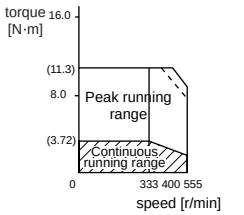
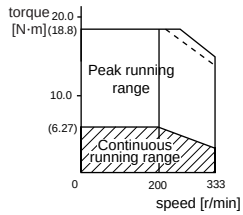
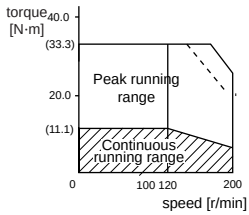
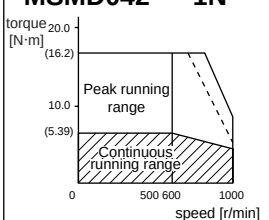
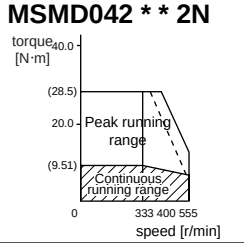
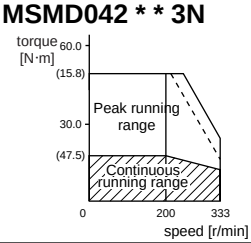
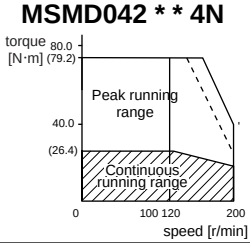
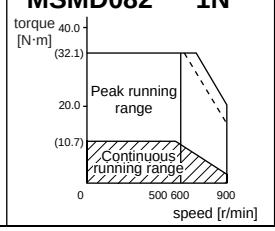
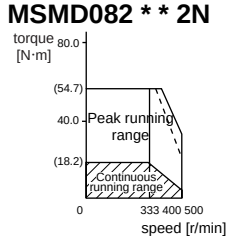
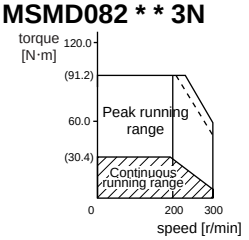
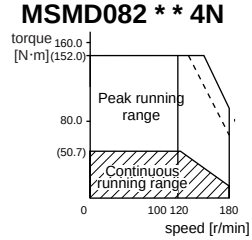
Unit : N (1kgf= 9.8N)

Motor output	Motor output	Permissible load at shaft	
		Radial thrust	Thrust load A and B-direction
100W	1/5	490	245
	1/9	588	294
	1/15	784	392
	1/25	1670	833
200W	1/5	490	245
	1/9	1180	588
	1/15	1470	735
	1/25	1670	833
400W	1/5	980	490
	1/9	1180	588
	1/15	1470	735
	1/25	2060	1030
750W	1/5	980	490
	1/9	1470	735
	1/15	1760	882
	1/25	2650	1320

Remarks on installation

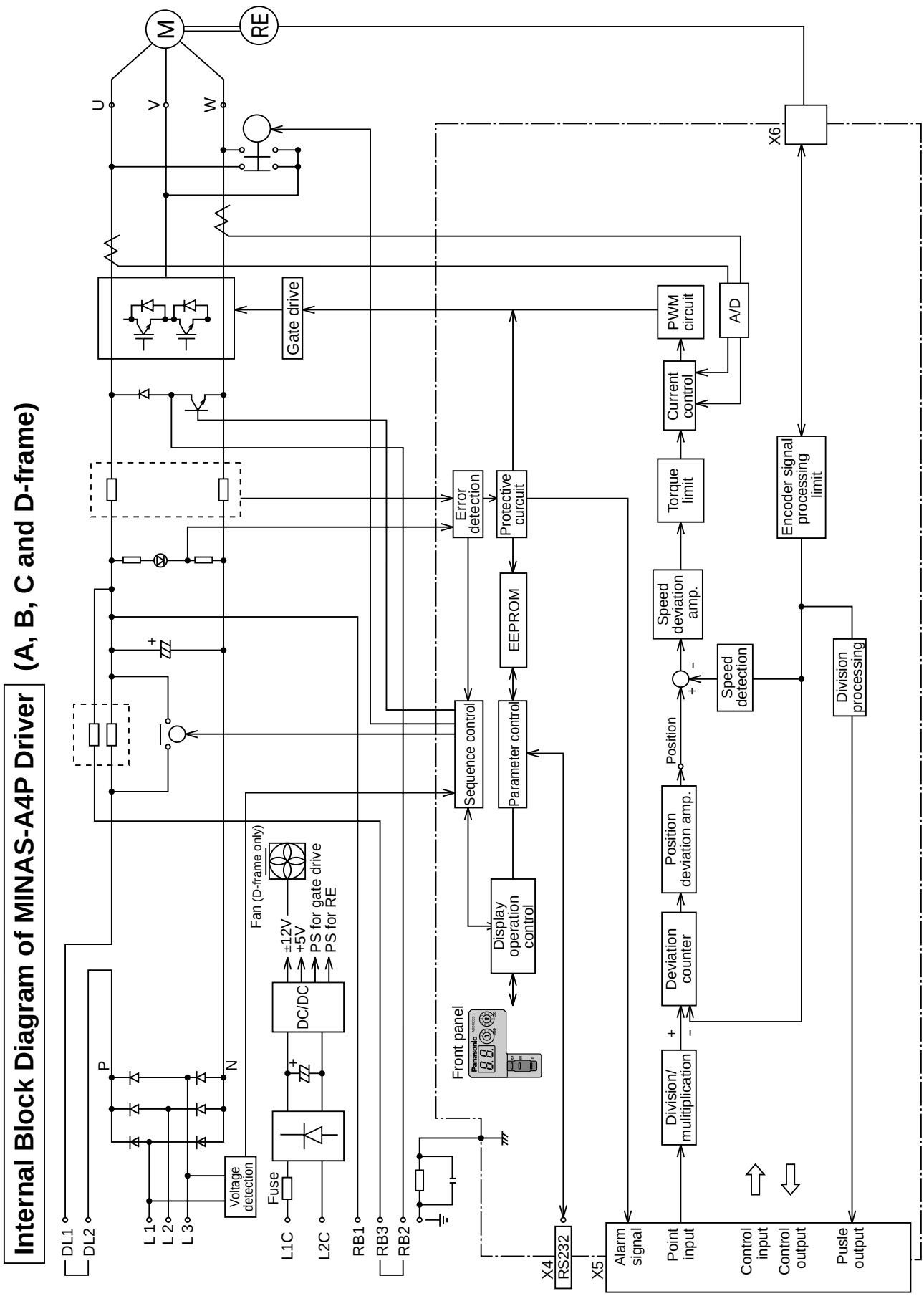
(1) Do not hit the output shaft of the gear reducer when attaching a pulley or sprocket to it. Or it may cause an abnormal noise.
(2) Apply the load of the pulley or the sprocket to as close to the base of the output shaft as possible.
(3) Check the mounting accuracy and strenght of the stiff joint, when you use it.
(4) The encoder is built in to the motor. If an excessive impact is applied to the motor while assembling it to the machine, the encoder might be damaged. Pay an extrta attention at assembly.

Characteristics of Motor with Gear Reducer [Supplement]

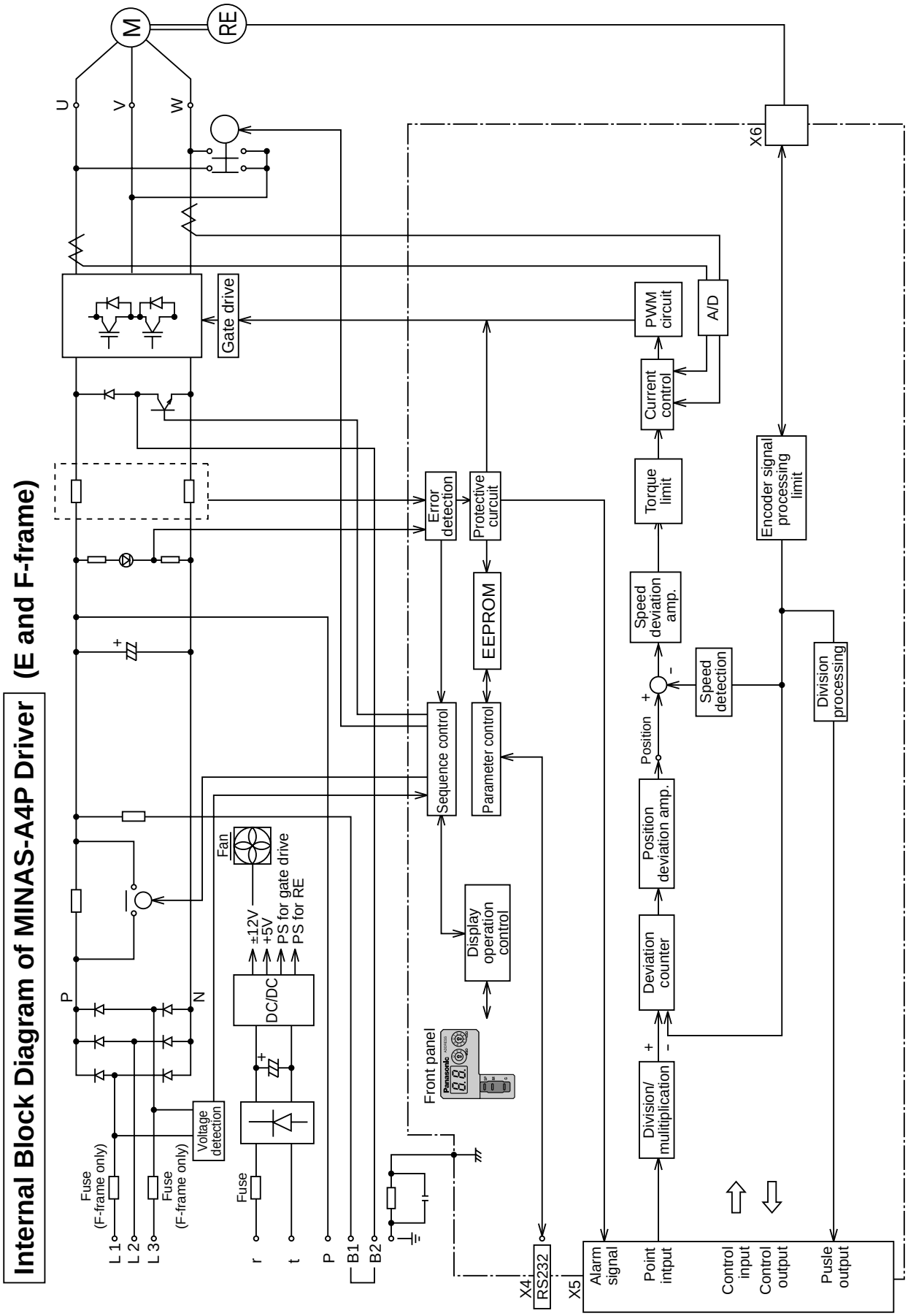
Supply voltage to driver	Motor output \ Reduction ratio	1/5	1/9	1/15	1/25
100V	100W	**MSMD011 * * 1N** 	**MSMD011 * * 2N** 	**MSMD011 * * 3N** 	**MSMD011 * * 4N** 
	200W	**MSMD021 * * 1N** 	**MSMD021 * * 2N** 	**MSMD021 * * 3N** 	**MSMD021 * * 4N** 
	400W	**MSMD041 * * 1N** 	**MSMD041 * * 2N** 	**MSMD041 * * 3N** 	**MSMD041 * * 4N** 
200V	100W	**MSMD012 * * 1N** 	**MSMD012 * * 2N** 	**MSMD012 * * 3N** 	**MSMD012 * * 4N** 
	200W	**MSMD022 * * 1N** 	**MSMD022 * * 2N** 	**MSMD022 * * 3N** 	**MSMD022 * * 4N** 
	400W	**MSMD042 * * 1N** 	**MSMD042 * * 2N** 	**MSMD042 * * 3N** 	**MSMD042 * * 4N** 
	750W	**MSMD082 * * 1N** 	**MSMD082 * * 2N** 	**MSMD082 * * 3N** 	**MSMD082 * * 4N** 

Dotted line represents the torque at 10% less supply voltage.

Block Diagram of Driver



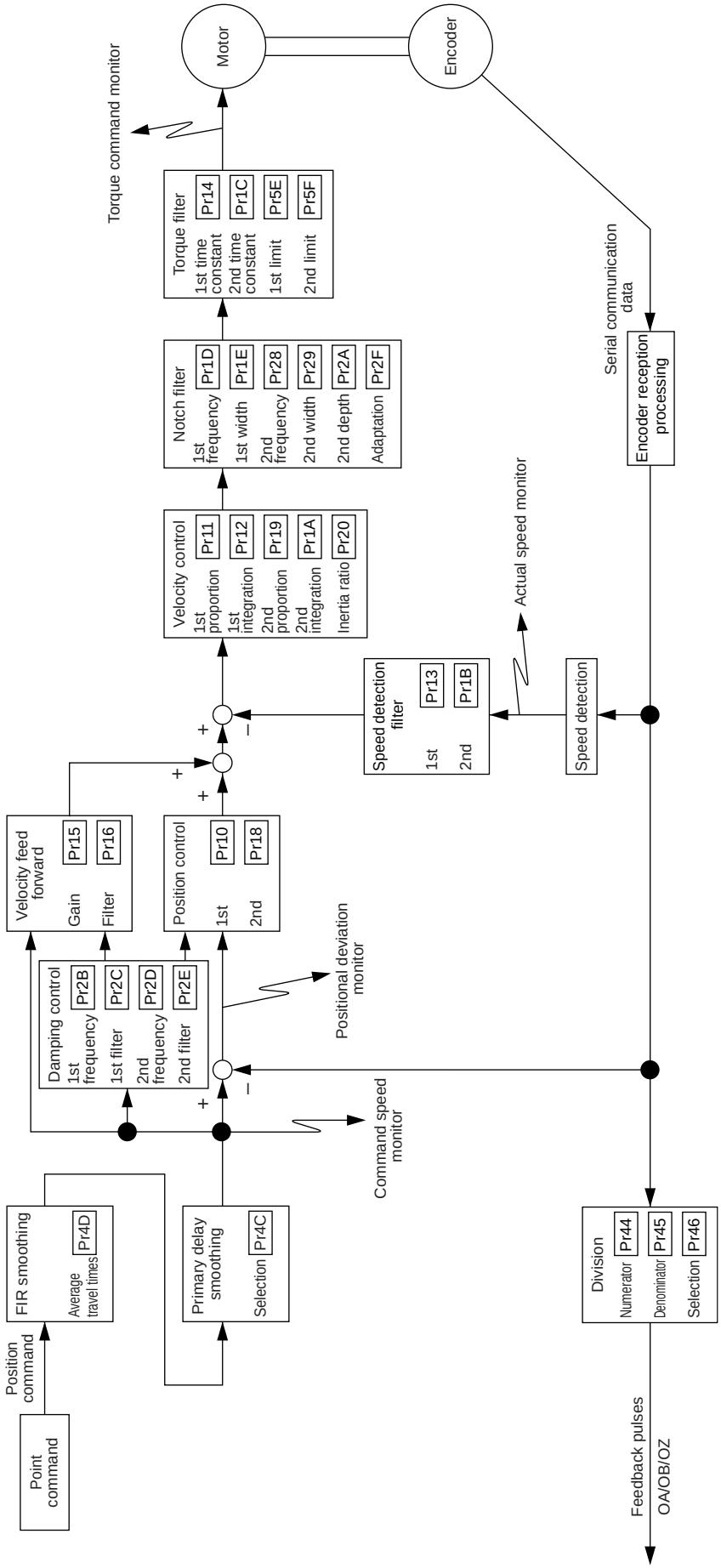
Internal Block Diagram of MINAS-A4P Driver (E and F-frame)



Block Diagram by Control Mode

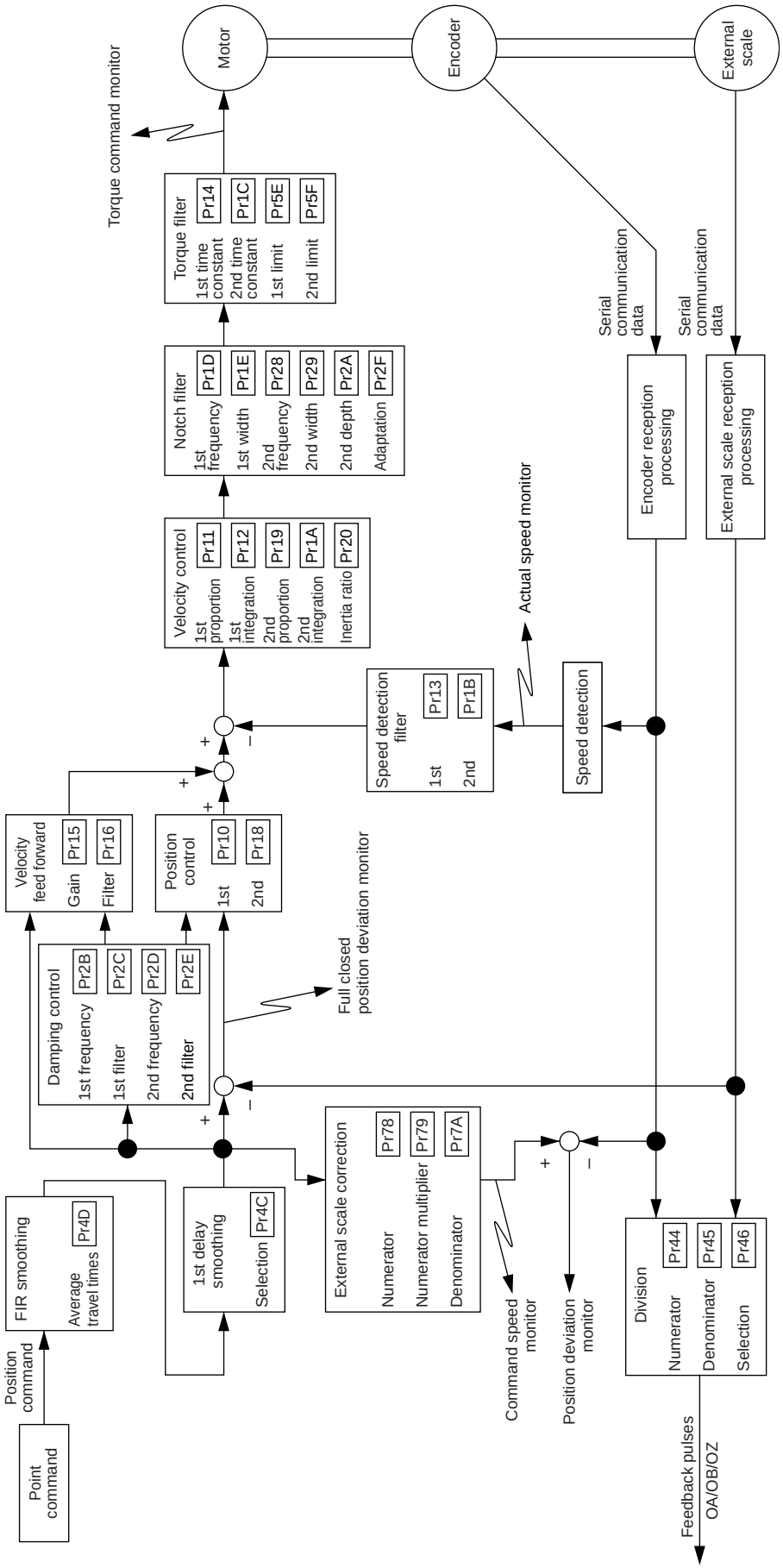
Position Control Mode

• when Pr02 (Setup of control mode) is 0



Full-closed Control Mode

• when Pr02 (Setup of control mode) is 6



Specifications (Driver)

Basic specifications	Input power supply	100V-line	Main circuit power		Single phase, 100 – 115V +10% –15% 50/60Hz
			Control circuit power		Single phase, 100 – 115V +10% –15% 50/60Hz
		200V-line	Main circuit power	Type A, B	Single phase, 200 – 240V +10% –15% 50/60Hz
				Type C, D	Single/3-phase, 200 – 240V +10% –15% 50/60Hz
				Type E, F	3-phase, 200 – 230V +10% –15% 50/60Hz
			Control circuit power	Type A to D	Single phase, 200 – 240V +10% –15% 50/60Hz
				Type E, F	Single phase, 200 – 230V +10% –15% 50/60Hz
	Operation conditions		Temperature		Operation temperature: 0 to 55 degrees Storage temperature: –20 to 80 degrees
			Humidity		Operation/storage humidity 90%RH or less (no condensation)
			Height above the sea		Height above the sea level: 1000 m or less
			Vibration		5.88 m/s^2 or less, 10 to 60 Hz (Continuous operation at resonance point is not allowed)
	Control method				IGBT PWM method, sinusoidal drive
	Control mode				Select Position control or Full-closed control by parameter.
	Encoder feedback				17 Bit (resolution: 131072) 7-serial absolute encoder 2500 p/r (resolution: 10000) 5-serial incremental encoder
	External scale feedback				Compatible with ST771 and AT500 made by Mitutoyo Corporation
	Control signal		Input (14 inputs)		CW over-travel inhibit, CCW over-travel inhibit, Home sensor, Emergency stop, Point specifying x6 Servo-ON, Strobe, Multi- function input x2
			Output (10 outputs)		Servo alarm, Brake release signal, Present position output x6, Positioning completion / Output during deceleration, Motor operation condition,
	Pulse signal		Input (4 inputs)		Encoder pulse (A/B/Z-phase) or external scale pulse (EXA/EXB-phase)is output by the line driver. For encoder Z-phase pulse, an open collector output is also available.
	Setup				Setup with Panaterm® or a console is available. (Panaterm® and a console are sold separately)
	Front panel				[1] 7-segment LED 2-digit [2] Analogue monitor pin (velocity monitor and torque monitor)
	Regeneration				Type A-B : No internal regenerative resist (external only) Type C-F : internal regenerative resist (external is also available)
	Dynamic brake				Built in

Function	Damping Control			A function to reduce vibration by removing the vibration frequency component when the front end of the machine vibrates.
	External scale division gradual increase setting range			Ratio between the encoder pulse (numerator) and the external scale pulse (denominator) can be set within the setting range : (1 to 10000 x $2^{(0-17)}$)/(1 to 10000)
	The number of points			maximum 60 points
	Operation mode	Homing operation		Eight types of homing operations [home sensor + Z phase (based on the front end), home sensor (based on the front end), home sensor + Z phase (based on the rear end), limit sensor + Z phase, limit sensor, Z phase homing, Bumping homing, and data set]
		Jog operation		The motor can be moved in a positive direction or negative direction independently. This is useful for teaching or adjustment.
		Step operation		The most basic operation. Specify a point number set in advance when performing the operation. The four types of modes [incremental operation, absolute operation, rotary axis operation and dwell timer (waiting time)]
		Block operation	Continuous block operation	Several step operations can be performed continuously. Once an operation starts, the operation continues to a specified point number.
			Combined block operation	A step operation is performed according to combined several point numbers. This is useful when you want to change the speed during a step operation.
		Sequential Operation		A point number increments by 1 automatically whenever an operation command is given. A step operation can be performed easily only by turning the STB signal on/off.
		Teaching (Console (option) is necessary)		You can operate the motor actually using this console, set a target position and execute some test operations.
	Auto tuning	Real time		Load inertia is determined at real time in the state of actual operation and gain corresponding to the rigidity is set automatically.
		Normal mode		Load inertia is determined by driving the equipment with operation command within the driver and gain corresponding to the rigidity is set automatically.
	Instantaneous speed observer			Available only for position control. A function to improve the speed detection accuracy, achieve the quick response and, at the same time, reduce the vibration at the stop by estimating the motor speed using a load model.
	Unnecessary wiring mask function			The following control input signal can be masked: CW over-travel inhibit, CCW over-travel inhibit, multi function input1 and 2 , point specifying input(P8-IN,P16-IN,P32-IN), Servo-ON
	Division function of encoder feedback pulse			The number of pulses can be set up arbitrarily. (at the maximum encoder pulse)
	Protection function	Hardware error		Overload, undervoltage, overspeed, overload, overheat, over current, encoder error, etc.
		Software error		Large positional deviation, Undefined data error , EEPROM error, etc.
	Alarm data trace back function			Traceable up to 14 alarm data including present alarm data.

Default Parameters (for all the models of A4P Series)

• Servo parameter (SV.Pr)

SV.Pr*	Parameter	Default
00	(For manufacturer's use)	1
01	7-segment LED status for console, initial condition display	1
02	Control mode	0
03	Torque limit selection	1
04	(For manufacturer's use)	1
05	(For manufacturer's use)	0
06	(For manufacturer's use)	0
07	Speed monitor (SP) selection	3
08	Torque monitor (IM) selection	0
09	(For manufacturer's use)	0
0A	(For manufacturer's use)	1
0B	Absolute encoder set up	1
0C	Baud rate of RS232	2
0D	(For manufacturer's use)	5
0E	(For manufacturer's use)	0
0F	Node address	0
10	1st position loop gain (*2)	(63/32)
11	1st velocity loop gain (*2)	(35/18)
12	1st velocity loop integration time constant (*2)	(16/31)
13	1st speed detection filter	(0)
14	1st torque filter time constant (*2)	(65/126)
15	Velocity feed forward	(300)
16	Feed forward filter time constant	(50)
17	(For manufacturer's use)	0
18	2nd position loop gain (*2)	(73/38)
19	2nd velocity loop gain (*2)	(35/18)
1A	2nd velocity loop integration time constant	(1000)
1B	2nd speed detection filter	(0)
1C	2nd torque filter time constant (*2)	(65/126)
1D	1st notch frequency	1500
1E	1st notch width selection	2
1F	(For manufacturer's use)	0
20	Inertia ratio	(250)
21	Real time auto tuning set up	1
22	Machine stiffness at auto tuning (*2)	4/1
23	Adaptive filter mode	1
24	Vibration suppression filter switching selection	0
25	Normal auto tuning motion setup	0
26	Software limit set up	10
27	Velocity observer	(0)
28	2nd notch frequency	1500
29	2nd notch width selection	2
2A	2nd notch depth selection	0
2B	1st vibration suppression frequency	0
2C	1st vibration suppression filter	0
2D	2nd vibration suppression frequency	0
2E	2nd vibration suppression filter	0
2F	Adaptive filter frequency	0
30	2nd gain action set up	(1)
31	1st control switching mode	(10)
32	1st control switching delay time	(30)
33	1st control switching level	(50)
34	1st control switching hysteresis	(33)
35	Position loop gain switching time	(20)
36	(For manufacturer's use)	(0)
37	(For manufacturer's use)	0
38	(For manufacturer's use)	0
39	(For manufacturer's use)	0
3A	(For manufacturer's use)	0
3B	(For manufacturer's use)	0
3C	(For manufacturer's use)	0
3D	(For manufacturer's use)	300
3E	(For manufacturer's use)	0
3F	(For manufacturer's use)	0

SV.Pr*	Parameter	Default
40	(For manufacturer's use)	5
41	(For manufacturer's use)	500
42	(For manufacturer's use)	0
43	(For manufacturer's use)	0
44	Numerator of output pulse ratio	10000
45	Denominator of output pulse ratio	10000
46	Pulse output logic inversion	0
47	(For manufacturer's use)	0
48	(For manufacturer's use)	10000
49	(For manufacturer's use)	0
4A	(For manufacturer's use)	0
4B	(For manufacturer's use)	10000
4C	Smoothing filter	1
4D	FIR filter set up	0
4E	(For manufacturer's use)	2
4F	(For manufacturer's use)	0
50	(For manufacturer's use)	0
51	(For manufacturer's use)	0
52	(For manufacturer's use)	2
53	Over-travel inhibit input valid	1
54	Over-travel inhibit input logic	0
55	Over-travel inhibit input operation setting	1
56	Home sensor input logic	1
57	Selecting the number of input points	2
58	Point specifying input logic setting	1
59	Multi-function input 1 Signal logic	1
5A	Multi-function input 1 Signal selection	0
5B	Multi-function input 2 Signal logic	1
5C	Multi-function input 2 Selection logic	0
5D	Servo-ON input valid	1
5E	1st torque limit (*1)	500
5F	2nd torque limit (*1)	500
60	In-position range	131
61	(For manufacturer's use)	50
62	(For manufacturer's use)	1000
63	(For manufacturer's use)	0
64	Output signal selection	0
65	Undervoltage error response at main power-off	1
66	(For manufacturer's use)	0
67	Error response at main power-off	0
68	Error response action	0
69	Sequence at Servo-OFF	0
6A	Mechanical brake delay at motor standstill	0
6B	Mechanical brake delay at motor in motion	0
6C	External regenerative resistor set up (*2)	0/3
6D	Main power-off detection time	35
6E	Emergency stop torque set up	0
6F	(For manufacturer's use)	0
70	Position deviation error level	25000
71	(For manufacturer's use)	0
72	Overload level	0
73	Overspeed level	0
74	(For manufacturer's use)	0
75	(For manufacturer's use)	0
76	(For manufacturer's use)	0
77	(For manufacturer's use)	0
78	Numerator of external scale ratio	10000
79	Multiplier of numerator of external scale ratio	0
7A	Denominator of external scale ratio	10000
7B	Hybrid deviation error level	100
7C	External scale direction	0
7D	(For manufacturer's use)	0
7E	(For manufacturer's use)	0
7F	(For manufacturer's use)	0

*1) A maximum value of SV.Pr5E (torque limit setting) varies depending on an applicable motor. Refer to page 78.
*2) Default parameters of SV.Pr10 to 12, 14, 18, 19, 1C, 22 and 6C vary depending on a driver.
*3) The parameters with parenthesized set value are specified automatically when real-time auto-gain tuning or normal-mode auto-gain tuning has been executed.

• 16-bit positioning parameter (16.Pr)

16.Pr* *	Parameter	Default
00	1st speed	0
01	2nd speed	0
02	3rd speed	0
03	4th speed	0
04	5th speed	0
05	6th speed	0
06	7th speed	0
07	8th speed	0
08	9th speed	0
09	10th speed	0
0A	11th speed	0
0B	12th speed	0
0C	13th speed	0
0D	14th speed	0
0E	15th speed	0
0F	16th speed	0
10	1st acceleration	0
11	1st S-shaped acceleration	0
12	1st deceleration	0
13	1st S-shaped deceleration	0
14	2nd acceleration	0
15	2nd S-shaped acceleration	0
16	2nd deceleration	0
17	2nd S-shaped deceleration	0
18	3rd acceleration	0
19	3rd S-shaped acceleration	0
1A	3rd deceleration	0
1B	3rd S-shaped deceleration	0
1C	4th acceleration	0
1D	4th S-shaped acceleration	0
1E	4th deceleration	0
1F	4th S-shaped deceleration	0
20	(For manufacturer's use)	0
21	(For manufacturer's use)	0
22	(For manufacturer's use)	0
23	(For manufacturer's use)	0
24	(For manufacturer's use)	0
25	(For manufacturer's use)	0
26	(For manufacturer's use)	0
27	(For manufacturer's use)	0
28	(For manufacturer's use)	0
29	(For manufacturer's use)	0
2A	(For manufacturer's use)	0
2B	(For manufacturer's use)	0
2C	(For manufacturer's use)	0
2D	(For manufacturer's use)	0
2E	(For manufacturer's use)	0
2F	(For manufacturer's use)	0
30	Homing speed (fast)	0
31	Homing speed (slow)	0
32	Homing offset speed	0
33	Homing acceleration	0

16.Pr* *	Parameter	Default
34	Homing deceleration	0
35	Homing direction	0
36	Homing type	0
37	Home complete type	0
38	Homing skip	0
39	Bumping detection time	0
3A	Torque limit for bumping homing	0
3B	Homing Z-phase count setting	0
3C	(For manufacturer's use)	0
3D	(For manufacturer's use)	0
3E	(For manufacturer's use)	0
3F	(For manufacturer's use)	0
40	Jog speed (low)	0
41	Jog speed (high)	0
42	Acceleration setting in jog operation	0
43	Setting of S-shaped acceleration in jog operation	0
44	Setting of deceleration in jog operation	0
45	Setting of S-shaped deceleration in jog operation	0
46	(For manufacturer's use)	0
47	(For manufacturer's use)	0
48	Teaching movement amount setting	0
49	Instantaneous stop deceleration time	0
4A	(For manufacturer's use)	0
4B	(For manufacturer's use)	0
4C	(For manufacturer's use)	0
4D	(For manufacturer's use)	0
4E	(For manufacturer's use)	0
4F	(For manufacturer's use)	0
50	Operation direction setting	1
51	Wrap around permission	0
52	Sequential operation setting	0
53	Sequential operation maximum point number	0
54	Block operation type	0
55	(For manufacturer's use)	0
56	(For manufacturer's use)	0
57	(For manufacturer's use)	0
58	(For manufacturer's use)	0
59	(For manufacturer's use)	0
5A	(For manufacturer's use)	0
5B	(For manufacturer's use)	0
5C	(For manufacturer's use)	0
5D	(For manufacturer's use)	0
5E	(For manufacturer's use)	0
5F	(For manufacturer's use)	0
60	(For manufacturer's use)	0
61	(For manufacturer's use)	0
62	(For manufacturer's use)	0
63	(For manufacturer's use)	0
64	(For manufacturer's use)	0
65	(For manufacturer's use)	0
66	(For manufacturer's use)	0
67	(For manufacturer's use)	0

• 32-bit positioning parameter (32.Pr)

32.Pr* *	Parameter	Default
0	Home offset	0
1	Setting of maximum movement in plus direction	0
2	Setting of maximum movement in minus direction	0
3	Movement per rotation in rotation coordinates	0
4	(For manufacturer's use)	0
5	(For manufacturer's use)	0
6	(For manufacturer's use)	0
7	(For manufacturer's use)	0

• Step parameter

32.Pr* *	Parameter	Default
01H to 3CH	Operation mode	Incremental
	Position/waiting time	0
	Speed	VEL1
	Acceleration	ACC1
	Deceleration	DEC1
	Block	Single

MEMO

Motor Company, Matsushita Electric Industrial Co.,Ltd.Marketeing Group

Tokyo: Kyobashi MID Bldg, 2-13-10 Kyobashi, Chuo-ku, Tokyo 104-0031 TEL (03)3538-2961
FAX (03)3538-2964

Osaka: 1-1, Morofuku 7-chome, Daito, Osaka 574-0044 TEL (072)870-3065
FAX (072)870-3151

After-Sale Service (Repair)

Repair

Consult to a dealer from whom you have purchased the product for details of repair.
When the product is incorporated to the machine or equipment you have purchased, consult to the manufacture or the dealer of the machine or equipment.

Cautions for Proper Use

- This product is intended to be used with a general industrial product, but not designed or manufactured to be used in a machine or system that may cause personal death when it is failed.
- Install a safety equipments or apparatus in your application, when a serious accident or loss of property is expected due to the failure of this product.
- Consult us if the application of this product is under such special conditions and environments as nuclear energy control, aerospace, transportation, medical equipment, various safety equipments or equipments which require a lesser air contamination.
- We have been making the best effort to ensure the highest quality of the products, however, application of exceptionally larger external noise disturbance and static electricity, or failure in input power, wiring and components may result in unexpected action. It is highly recommended that you make a fail-safe design and secure the safety in the operative range.
- If the motor shaft is not electrically grounded, it may cause an electrolytic corrosion to the bearing, depending on the condition of the machine and its mounting environment, and may result in the bearing noise. Checking and verification by customer is required.
- Failure of this product depending on its content, may generate smoke of about one cigarette. Take this into consideration when the application of the machine is clean room related.
- Please be careful when using in an environment with high concentrations of sulphur or sulphuric gases, as sulphuration can lead to disconnection from the chip resistor or a poor contact connection.
- Take care to avoid inputting a supply voltage which significantly exceeds the rated range to the power supply of this product. Failure to heed this caution may result in damage to the internal parts, causing smoking and/or a fire and other trouble.

Technical information

Electric data of this product (Instruction Manual, CAD data) can be downloaded from the following web site.
http://industrial.panasonic.com/ww/i_e/25000/motor_fa_e/motor_fa_e.html

MEMO (Fill in the blanks for reference in case of inquiry or repair.)

Date of purchase		**Model No.**	**M☐DD** _____ **M☐MD** _____ **M☐MA** _____
Dealer			
	Tel : ( ) -		

Motor Company
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